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To evaluate the effectiveness of an engineered classroom design, 54 educationally handicapped children were placed in six classrooms, each with a teacher and an aide. Each classroom was set up with three major centers: mastery-achievement, exploratory-social, and attention-response-order. Children were assigned tasks at centers in keeping with their individual problems and were awarded check marks every fifteen minutes for behavior and work according to behavior modification principles. Achievement was tested three times over the year; daily task attention was recorded by two observers who clocked the number of seconds each child's eyes were on an assigned task during 5-minute samples taken five times daily. Children in the experimental classroom utilizing the engineered design enjoyed a five to twenty per cent task attention advantage over children in the control classrooms not using the check mark system and all aspects of the design. Experimental classes which abruptly withdrew the design at mid-year showed no decrease in task attention, in fact they improved. While reading and spelling gains were not significantly different between experimental and control conditions, gains in arithmetic fundamentals were significantly correlated with the presence of the engineered design. (Author/RJ)

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THE SANTA MONICA PROJECT

DEMONSTRATION AND EVALUATION OF AN ENGINEERED CLASSROOM DESIGN FOR EMOTIONALLY DISTURBED CHILDREN IN THE PUBLIC SCHOOL

PHASE I: ELEMENTARY LEVEL

December 1967

U.S.DEPARTMENT OF
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PHASE I: ELEMENTARY LEVEL

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SUMMARY

The Santa Monica Project evaluated the effectiveness of an engineered classroom design over a one year period with educationally handicapped children in the Santa Monica Unified School District in California. The design has been described elsewhere (Hewett, 1967) and is concerned with getting educationally handicapped children paying attention, responding, following directions, exploring their environment and getting along with others before holding them for academic and intellectual performance. This is accomplished in a classroom set up with three major centers: (1) Mastery-achievement, (2) Exploratory-social, (3) Attention-response-order. Children are assigned tasks at each center in keeping with their individual educational problems and are awarded check marks each fifteen minutes for behavior and work, according to behavior modification principles. The dependent variable in the project included achievement testing three times over the year and daily task attention measurements. Task attention was recorded by two observers present in both experimental and control classrooms who clocked the number of seconds each child's eyes were on an assigned task during five-minute samples taken five times daily. In general, children in the experimental classrooms utilizing the engineered design enjoyed a five to twenty percent task attention advantage over children in the control classroom~~s~~ not using the check mark system and all aspects of the design. Experimental classes which abruptly withdrew the design at mid-year showed no decrease in task attention, in fact they improved. While reading and spelling gains were not significantly different between experimental and control conditions, gains in arithmetic fundamentals were significantly correlated with presence of the engineered design.

CHAPTER I

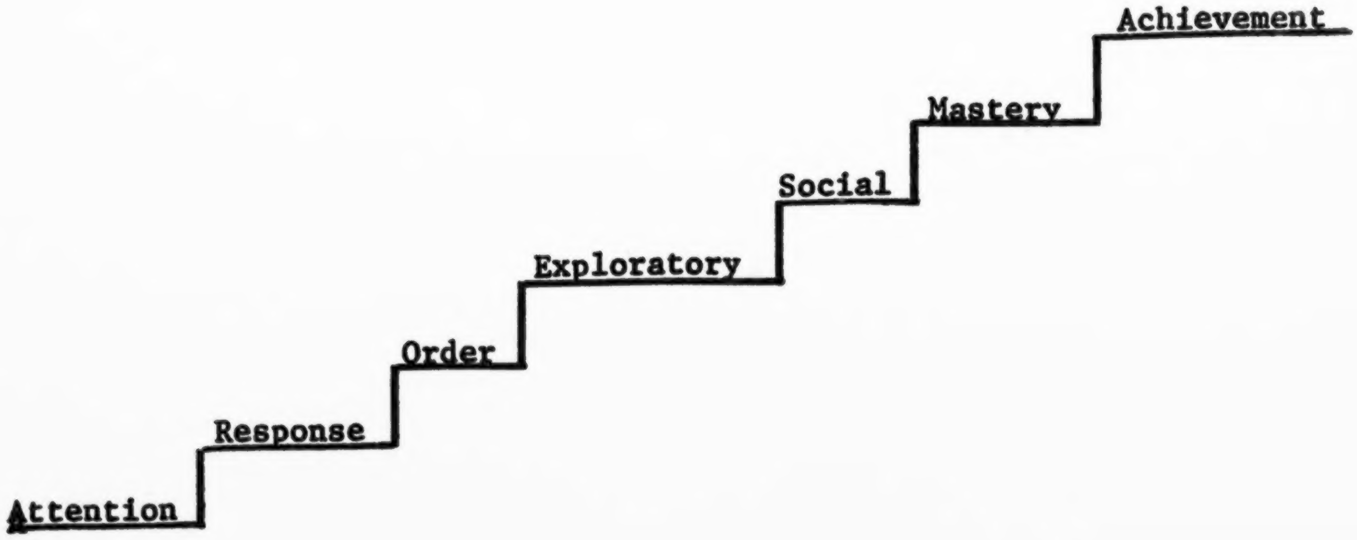
Introduction

The Santa Monica Project was an attempt to refine and develop an engineered classroom design (Hewett, 1967) investigated in pilot form earlier (Hewett, 1966) and to evaluate its effectiveness with emotionally disturbed children in the public school.

The design utilized the goals inherent in a developmental sequence of educational goals. (Hewett, 1964) This developmental sequence specified seven classes of behavior in a hierarchial relationship which are necessary for successful adaptation and learning in school. The developmental sequence appears in Figure I. Initial concern is with getting the child paying attention to learning tasks, to reality rather than fantasy, to appropriate behavior and stimuli in the classroom, to the teacher and to function efficiently in attending so he retains that which is presented. Next, it is the childs response to learning tasks that is crucial. He must respond in a variety of situations, develop a wide range of interests and be able to respond in a classroom setting. The order level follows and is focused on getting the child to follow directions, to control himself while pursuing learning tasks and while working with others and finally to complete work which he starts. At the exploratory level, next in the sequence, the goals are to get the child to thoroughly and accurately explore his environmnet, to develop independent interests and to function as adequately as possible in motor, physical, sensory, and perceptual areas. On the social level it is the childs relationships with others which are of major concern. Helping him acquire behavior which gains approval from others and avoids disapproval is important as is freeing him from overdependence on teachers and peers. These five levels constitute readiness goals for learning and are largely mastered by normal children before they enter school. It is the emotionally disturbed childs failure to master them that accounts for his difficulties in school. By means of the developmental sequence forms found in Appendix I the teacher assesses the child at each level and describes him as an "educational casualty" rather than relying on second hand terminology from psychiatry, neurology, clinical psychology and pediatrics. The final two levels on the developmental sequence mastery and achievement are concerned with acquisition of intellectual and academic skills and a self-motivation for learning.

Figure I

A Developmental Sequence of Educational Goals



Level	*Attention*	*Response*	*Order*	*Exploratory*	*Social*	*Mastery*	*Achievement*
Child's Problem	Inattention due to withdrawal or resistance	Lack of involvement and unwillingness to respond in learning	Inability to follow directions	Incomplete or inaccurate knowledge of environment	Failure to value social approval or disapproval	Deficits in basic adaptive and school skills not in keeping with IQ	Lack of self motivation for learning
Educational Task	Get child to pay attention to teacher and task	Get child to respond to tasks he likes and which offer promise of success	Get child to complete tasks with specific starting points and steps leading to a conclusion	Increase child's efficiency as an explorer and get him involved in multisensory exploration of his environment	Get child to work for teacher and peer group approval and to avoid their disapproval	Remediation of basic skill deficiencies	Development of interest in acquiring knowledge
Learner Reward	Provided by tangible rewards (e.g., food, money, tokens)	Provided by gaining social attention	Provided through task completion	Provided by sensory stimulation	Provided by social approval	Provided through task accuracy	Provided through intellectual task success
Teacher Structure	Minimal	Still limited	Emphasized	Emphasized	Based on standards of social appropriateness	Based on curriculum assignments	Minimal

The methodology of the engineered classroom design is based pragmatically - not rigidly - on behavior modification theory as discussed in Ullmán and Krasner (1965) and exemplified in the Ranier School project in Buckley, Washington. (Birnbrauer, Bijou, Wolf, & Kidder, 1965) It conceives of three ingredients being necessary for learning in the classroom. (1) selection of a suitable educational task the child needs to do, is ready to do, and can be successful doing, (2) a meaningful reward for approximating or successfully undertaking the learning task, and (3) a suitable degree of structure or teacher control in the assignment of the task which determines the conditions under which the reward will be provided for the child.

Application of behavior modification theory to special education may also be found in the writing of Quay, (1966) Harring & Phillips, (1962) Whelan & Haring, (1966) Patterson & Ebner, (1965) and Zimmerman & Zimmerman (1962).

The engineered classroom design attempts a translation of the goals of the developmental sequence and the methodology of behavior modification theory into classroom reality. The curriculum material to augment the design was prepared by the staff of the Santa Monica Schools under the direction of Dr. Frank D. Taylor. A complete description of the engineered classroom design, its operation, schedule, and curriculum appears in Appendix II.

In addition the numerous presentations made by the authors locally and nationally to disseminate the program and findings of the Santa Monica Project are listed in Appendix III.

To augment the final report and actually demonstrate the goals and methodology of the engineered classroom design, a 25 minute, 16mm sound color film, "The Santa Monica Project", is also submitted.

CHAPTER II

Methods

In the evaluation study, the engineered classroom design constituted the experimental condition while the control condition or traditional classroom design consisted of any approach the teacher chose to follow which did not include the use of check marks, token, or any other tangible rewards. The independent variable, then, was rigid adherence to the engineered classroom design including the use of check marks. An attempt was made to equate all other variables in the project classrooms. The criteria utilized for assessing the effectiveness of the two classroom conditions or the dependent variables in the evaluation will be presented in a later section.

We turn now to a discussion of the setting in which the evaluation took place, selection and training of teachers, selection and grouping of students, and procedures followed.

Setting

The Santa Monica Unified School District is located west of Los Angeles in the community of Santa Monica, California and includes the coastal area of Malibu, some twenty-five miles to the north. The district serves some twenty-six thousand children, adolescents and young adults from preschool through junior college. The homes these individuals come from represent a broad range of socio-economic levels and groups at the two extremes are well represented. In actuality, the socio-economic distribution of the community is similar to that found in the greater Los Angeles County area and hence the Santa Monica Unified School District offers an ideal setting within which to conduct research.

Four elementary schools and one junior high school were selected in the district and one or two project classrooms set up in each school. The junior high school setting was used for a pilot class and not included in the evaluation portion of the project. The project classrooms were located within the regular building areas of the schools on the basis of availability rather than consideration of special needs of educationally handicapped children. The majority of children enrolled in the project were brought to the schools by means of district busses.

Teacher and Aide Selection and Training

Six female elementary school teachers were selected from among new teaching applicants in the Santa Monica district for the project. Two additional teachers were selected to conduct demonstration and pilot classes at the elementary and junior high level which were not evaluated but were used for visitation and continuous innovation. None of the project teachers had ever taught before in the Santa Monica Schools. One had never taught and the teaching experience of the others ranged from three to eight years. Only one teacher had previously worked with children with learning problems in the public school. Selection of the project teachers was made by the Santa Monica Unified School District Personnel Office on the basis of strong qualifications and an expression of willingness to participate in a project with educationally handicapped children.

A two week training program was conducted in order to acquaint the teachers with the developmental strategy and the engineered classroom design. All project teachers participated in a series of daily four hour lectures and demonstrations. The training program also included having each teacher play the part of student, teacher, and aide in an engineered classroom and then spend one day as teacher and later as aide in a room with actual educationally handicapped students.

At the close of the training program each teacher's name was placed on a slip of paper, the slips shuffled and then one at a time drawn randomly, in order to determine assignment to either an experimental classroom or control classroom. Although only teachers in the experimental classrooms were required to adhere to the engineered design, training all of the teachers in this special approach was seen as necessary in an attempt to control the amount of information, supervision and training provided by the district prior to the beginning of teaching and to some extent, degree of teacher involvement and motivation. In addition, the random assignment of similarly trained teachers to experimental and control conditions represented a further attempt to at least partially control variability in length of previous teaching experience, individual personality factors and teaching competence. The "teacher variable" is a particularly complex one to deal with in educational research. No two teachers relate to children, teach subject matter, or function in the classroom in exactly the same manner. The best laid plans of experimenters setting up experimental teaching conditions often fail because what actually takes place in a classroom has more to do with the teacher and differences in teaching style than any other variable involved. Nevertheless, some control of the "teacher variable" can be obtained through exposing all teachers to the same prior training and then randomly assigning them to experimental or control conditions as was done in this study.

As was previously stated, experimental teachers were to adhere rigidly to the engineered design including the giving of check marks every fifteen minutes while control teachers could use any aspect of the developmental strategy or engineered classroom design they chose except check marks or other token or tangible rewards. Additional discussion of the two classroom conditions will follow in a later section. Throughout the study all teachers received identical amounts of supervision from project staff and had access to the same curriculum materials and classroom supplies.

Eight teacher aides (without prior teaching experience) were selected for the project from housewives and graduate students. They were given the same preliminary training as the teachers and then randomly paired with project teachers so that the nine students in both experimental and control classrooms were supervised by a teacher and an aide.

Selection and Grouping of Students

Fifty-four educationally handicapped children attending school in the Santa Monica District, between the ages of eight and twelve, were located by school psychologists attached to the district's Department of Special Services. These children had been referred by elementary school principals throughout the district because of difficulties in adjusting to school and/or profiting from instruction. They had all been given an individual intelligence test (Wechsler Intelligence Scale for Children) and were functioning within the Full Scale IQ range of 85-113. The majority of these children were emotionally disturbed with serious problems on the first five levels of the developmental sequence and in addition were academically retarded.

Since the California State Department of Education does not classify children with serious attention, response, order, exploratory, social, or mastery problems in school as "emotionally disturbed" but rather uses the label "educationally handicapped" (EH) the children selected for this project met the following requirements for inclusion in a state subsidized EH classroom:

> "educationally handicapped minors are minors, other than physically handicapped minors...or mentally retarded minors...who, by reason of marked learning

> or behavioral problems or a combination thereof, cannot receive the reasonable benefit of ordinary education facilities." (Calif. Education Code)

In addition to the individual intelligence tests all children were given physical examinations and were found to be free from primary physical handicapping conditions. Once the fifty-four project children had been selected and designated "educationally handicapped" through psychological and medical appraisal the following additional tests were given each child before the start of the project: the Reading Vocabulary, Reading Comprehension and Arithmetic Fundamentals sections of the California Achievement Test (CAT), Elementary Level, and the Reading and Spelling sections of the Wide Range Achievement Test. (WRAT) The California Achievement test was utilized to provide a measure of independent, silent, reading ability and arithmetic computational skills. The Wide Range Achievement test assessed word recognition and spelling. These tests were administered outside the classroom on a group basis by the same psychologists at the beginning, middle, and end of the project.

The children were grouped into six classrooms of nine students each on the basis of IQ, age, and reading and arithmetic levels in that order of priority. Sex was a variable which was not possible to control because of the small number of girls referred to the project. Factors such as the psychologists diagnostic impression, ethnic background and parental socio-economic level were also not possible to consider because of the difficulty in attempting to equate six groups with respect to IQ, age, and achievement level. Some attempt was made to place children in classes which would be housed in or near their regular elementary schools but no child was assigned a group because it was felt that he could profit more from the experimental or control condition. The class groupings were completed before any assignment of teachers or classroom condition was made. The six groups with initial individual data on project students regarding IQ, age, reading and arithmetic level , and sex are presented in Table I. The mean IQ for all age groups was 94 (range 85-113), mean age-10 years, 3 months (range 8-0 - 11-11), mean reading achievement level was 2.8 (range 0-6.2)) and mean arithmetic achievement level 3.3 (range 0-5.2). The original N of 54 was reduced to 45 due to incomplete data obtained on nine children during the course of study. Therefore only the initial data on those students for whom complete records were available is reported in Table I.

Procedures

It was stated earlier that the central concern of this evaluation was whether adherence to the engineered classroom design and the systematic giving of check marks resulted in a more effective educational program for educationally handicapped children than a program of any type which did not offer token or tangible rewards. We come now to the design of the study itself.

With regard to the effect of a token or tangible reward system on learning and behavior several questions immediately arise:

1. What is the effect of such a system on educationally handicapped children who previously have been in a regular class?
2. What is the effect on educationally handicapped children who previously have been in a small individualized class which did not use such a reward system?
3. What will be the effect of abruptly withdrawing the reward system from a class of educationally handicapped children which has become accustomed to it?

The design of the evaluation portion of the Santa Monica Project attempted to shed light on answers to these questions. The assignment of the classes discussed in Table I to either experimental or control conditions is shown in Table 2. As can be seen, two of the six classes (Classes E and C) maintained year long programs according to either the experimental or control condition. Two classes (Classes CE) began using the control condition and rotated to the experimental condition at mid-year. For the two remaining classes (Classes EC) the reverse was true. Classes E and C were concerned with question one. Children in these rooms had been enrolled in regular public school classes prior to the Fall semester when the project began. Classes E and C provided a comparison of experimental and control conditions over a one year period. Classes CE were focused on question two. Following a one semester period in a small class with nine students and two teachers the experimental condition was introduced. Thus an opportunity was afforded to evaluate separately the effect of being in a small, special class as compared to being in the class with the addition of the experimental condition. Classes EC were set up to provide information on question three. Once a class has been exposed to the experimental condition, what happens when the reward system is abruptly removed?

S	I.Q.	Age	CAT Total Reading Grade Equiv.	CAT Arith. Fund. Grade Equiv.	Sex	S	I.Q.	Age	CAT Total Reading Grade Equiv.	CAT Arith. Fund. Grade Equiv.	Sex
Classroom 1 (N=7)						Classroom 2 (N=7)					
1	97	11-4	5.9	4.5	M	1	94	11-0	3.7	4.1	M
2	88	9-11	2.0	3.0	M	2	88	11-9	2.0	3.3	M
3	88	11-2	2.9	3.8	M	3	96	8-0	2.0	3.0	M
4	99	9-9	2.4	3.7	M	4	113	9-1	2.1	3.2	M
5	99	10-6	2.0	4.1	M	5	93	10-6	3.5	3.1	M
6	88	10-0	2.8	3.2	M	6	87	11-11	3.1	4.9	M
7	91	9-11	3.3	2.9	F	7	93	11-2	4.4	3.3	F
	Mean=93	10-4	3.0	3.6			Mean=95	10-6	2.9	3.5	
Classroom 3 (N=7)						Classroom 4 (N=8)					
1	90	10-9	2.7	4.6	M	1	106	8-2	3.7	2.2	M
2	87	11-4	2.4	0	M	2	110	8-1	2.1	3.1	M
3	101	8-0	2.2	3.0	M	3	96	11-3	2.0	2.6	M
4	103	10-9	2.0	3.0	M	4	91	11-8	2.8	4.2	M
5	85	11-9	2.0	3.5	M	5	96	9-6	4.5	2.7	M
6	86	11-0	3.7	4.4	M	6	86	11-5	3.2	3.8	M
7	91	11-0	2.7	2.8	M	7	93	9-11	2.3	3.0	M
	Mean=92	10-8	2.5	3.0		8	90	10-10	4.6	4.5	M
							Mean=96	10-1	3.2	3.3	
Classroom 5 (N=7)						Classroom 6 (N=9)					
1	107	8-0	0	2.9	M	1	96	11-9	2.4	3.5	M
2	95	9-11	2.5	3.2	M	2	88	9-10	2.0	2.2	M
3	96	9-10	2.6	3.3	M	3	100	9-2	2.0	0	M
4	85	9-11	0	2.9	M	4	86	11-11	2.0	3.2	M
5	91	9-1	4.1	2.8	F	5	86	11-11	2.0	3.2	M
6	99	10-10	6.0	3.7	M	6	92	9-4	2.6	3.3	M
7	111	10-10	6.2	4.8	M	7	104	9-11	2.0	5.2	M
	Mean=98	9-9	3.0	3.4		8	88	9-0	2.0	3.1	M
						9	94	10-1	3.4	3.1	M
							Mean=93	10-4	2.3	3.0	

Table 1

Individual Data on Project Students

Table 2

Assignment of Project Classes to Experimental and Control Conditions

Class	Fall Semester	Spring Semester
1 (E)	Experimental	Experimental
2 (C)	Control	Control
3 & 4 (CE)	Control	Experimental
5 & 6 (EC)	Experimental	Control

Following the two week teacher training program, the selection and grouping of students, the random placement of each teacher and aide and assignment of experimental or control condition to the classes themselves, as shown in Table 2, the Santa Monica Project began on the first day of the Fall semester. All classrooms were arranged with the help of the three authors and the supervision of the Project Coordinator. Classes which would utilize the engineered design were set up specifically as described in other parts of this report. Classes which were to operate as controls could use any approach including the engineered classroom, schedule, floorplan, Order and Exploratory centers, and study booths which the teacher assigned to them desired but no check marks or other token or tangible rewards.

The major dependent variable utilized in Santa Monica classes to assess the effectiveness of the experimental and control conditions was task attention. Task attention was defined as the time spent by a student maintaining eye contact with the task or assignment given him by the teacher. In situations where eye contact was irrelevant to the task (e.g. listening to a record) or where the students eyes could not be seen, appropriate head and body orientation toward the task was credited as "task attention."

Two observers sat in front of each of the six classrooms for two and one-half hours every morning during the entire year of the project. These observers were undergraduate college students recruited and trained for this assignment. Each observer held a stop watch and was assigned either four or five children to observe regularly. The children were observed for five minute segments throughout the two and one half hour observation periods in random order so that at least five separate samples of task attention were obtained on each student each day. The observation period in the experimental classrooms coincided with the order, reading or written language and arithmetic periods. Teachers in the control classrooms also presented these subjects (with the possible exception of the order period which was not compulsory in the control classroom) at the same times so the type of activities the students were given during the observation period was controlled.

Observers operated the stop watches during each five minute student task attention sample and immediately recorded the number of seconds the student's eyes (or in some cases, head and body) had been appropriately oriented toward the assigned task. The criteria used for deciding when a student was "attending" appear in Appendix IV.

Project observers were trained by two graduate assistants who had established a nine percent or better agreement between themselves for task attention measurements. Each observer was then paired with one of the graduate assistants until his reliability was established at a ninety percent or better level. Every two weeks the two graduate assistants rotated through the classrooms rechecking the reliability among the observers and themselves and at no point in the project was agreement found to be below the eighty-five percent level.

Daily individual task attention percentages were obtained on each child by using his total observed task attention time as the numerator in a proportion with the total observed time as a denominator. These daily percentages were totalled for all the children in a class and a weekly task attention percentage mean obtained for each project class throughout the year. Whenever a teacher was absent, task attention measures taken in her room were excluded from the data.

Once a week all six classrooms were visited by the authors, who were accompanied bythe Project Coordinator. An attempt was made to equate the actual time spent during such visitations in each room. In general outside visitors were not permitted in any project classroom, as a demonstration room, not included in the evaluation portion of the project, had been set up specifically for this purpose. Weekly meetings were held at which time the project teachers were either seen in two separate groups representing the experimental or control conditions, or during individual conferences. At these meetings curriculum materials were made available to all teachers and specific problems of concern to the teachers were discussed. Most problems regarding individual students were taken up by the Project Coordinator who was available to both experimental and control teachers alike for consultation. With experimental teachers he continually referred to the engineered classroom design and its resources for the handling of the problems. With control teachers he made similar suggestions (without reference to the giving of tangible or token rewards) but was usually less specific and offered several alternatives.

Separate meetings of the project staff and the parents of the children enrolled in each class were held near the start of the project. Although each parent had given written permission for his child to be enrolled in the special program he had not been introduced to the specific nature of the project. This was done at the meeting and various questions parents raised were considered. The childrens' parents were not regularly involved in any other phase of the project.

All students were re-tested with the achievement tests used in the initial screening at mid-year and at the close of the project. At mid-year, classes CE introduced the engineered design to students on the first Monday morning of the Spring semester as indicated in Table 2. The teachers in these rooms followed the procedures initially used by the teachers in classes EC in presenting the check mark system and other aspects of the design to students as explained elsewhere. At the same time classes EC abruptly withdrew the check mark system and became control classes as shown in Table 2. On the first Monday morning of the Spring semester the teacher simply announced "We are not going to use check marks anymore." The room had been altered in its appearance and more traditional bulletin boards introduced. These teachers, like the control teachers initially, were free to select any other approach or to retain aspects of the engineered design as they chose except that they were required to discontinue the use of check marks or any other token or tangible reward system. Class E continued as a year long experimental class and Class C continued as a year long control class.

CHAPTER III

Results

The results of the project evaluation will be discussed with reference to the three main questions presented earlier. In the statistical treatment of all data, a level of confidence of .05 was established. Therefore, no differences between groups is considered significant if the .05 level or better was not obtained.

What is the effect of rigid adherence to the engineered classroom and use of token and tangible reward systems on educationally handicapped children who previously have been in a regular class?

Class E and Class C were compared on four achievement tests as shown in Table 3. Group means (in raw score units) and standard deviations for these tests appear in this table. A series of analyses of covariance was done with these means comparing the classes' post test means with the appropriate pretest as the covariat. The covariance approach was utilized to take into account differences in initial achievement level (pre) existing among students in the two classes.

Only one comparison produced significant results. This was with arithmetic fundamentals. As can be seen from Table 4, which presents the analysis of covariance data, Class E improved significantly more than Class C in arithmetic fundamentals over the project year. The mean arithmetic fundamentals grade equivalent for Class E was 3.9 (converted from raw score units in Table 3) at the start of the project and went to 5.1 at the close (total year gain 1.2 years). For Class C, the initial mean grade equivalent was 3.4 and final mean 3.8 (total year gain .4 year). Table 5 reports the differences between original means and the adjusted means used in the analysis of covariance.

Table 6 presents the mean task attention percentages and standard deviations for all six classes, averaged for four week intervals during the Fall and Spring semesters. Intervals 1 and 5 represent weeks 2-5 during the Fall and Spring semesters respectively since observations were not done the first week of either semester. The mean task attention percentages are based on five daily five minute observations made on every child in a given class and in most cases at least 100 such observations were made on each child during each four week interval. These were then totalled and a resultant class mean task attention percentage obtained.

Table 3

Means and Standard Deviations for Class E and Class C on Achievement Tests

Test	Pre				Mid				Post			
	E		C		E		C		E		C	
	M	σ	M	σ	M	σ	M	σ	M	σ	M	σ
WRAT Spelling	29.8	6.1	28.9	7.8	27.1	6.3	26.7	9.2	30.0	5.3	31.1	8.0
WRAT Reading	45.2	14.3	42.9	14.6	44.7	9.4	42.8	18.4	47.9	13.0	49.1	15.7
CAT Total Reading	31.4	34.1	23.1	19.9	33.1	38.7	34.4	24.2	38.0	30.6	34.0	28.2
CAT Arith Fund.	15.1	12.2	10.5	6.5	20.7	13.4	13.9	7.5	24.9	11.7	14.5	8.3

Table 4

Analysis of Covariance for Class E and Class C on Post Test Results of CAT Arithmetic Fundamentals (covariat pre-test)

Source of Variation	df	Sums of Squares	Mean Square	F
E-C	1	211.04	211.04	7.65*
Individual Differences	11	303.48	27.59	
Total	12	514.52		

*$p < .05$

Table 5

Means and Adjusted Means for Analysis of Covariance for Class E and Class C on Post Test Results on CAT Arithmetic Fundamentals (covariat pre-test)

Class	Mean	Adjusted Mean
E	24.9	23.9
C	15.1	16.1

Table 6

Mean Task Attention Percentages and Standard Deviations for All Treatment Groups, Averaged for Four Week Intervals during Fall and Spring Semesters

		Fall Semester				Spring Semester			
Class		1 weeks 2-5	2 weeks 6-9	3 weeks 10-13	4 weeks 14-17	5 weeks 2-5	6 weeks 6-9	7 weeks 10-13	8 weeks 14-17
E	M	82.3	87.6	94.2	93.8	92.0	93.9	94.8	94.0
	σ	3.5	3.7	4.2	4.3	3.6	3.0	2.1	4.0
C	M	90.7	84.5	81.1	89.0	86.7	86.3	86.7	84.4
	σ	6.2	6.3	5.8	5.1	4.4	6.1	6.2	9.9
EC	M	85.5	85.8	87.7	86.6	85.6	90.0	91.8	91.3
	σ	7.7	6.6	7.3	6.9	6.5	4.7	3.8	5.3
CE	M	76.2	78.0	84.3	81.6	84.5	91.0	92.0	90.5
	σ	13.8	11.7	5.8	7.8	4.9	2.3	2.7	4.1

Figure 2 graphs the comparative four week mean task attention percentage for Class E and Class C over the year long project. F values obtained from analyses of variances with the means in each interval are also reported. During interval 1, Class C enjoyed a significant initial advantage over Class E but this was not maintained and in interval 2 Class C fell slightly below Class E. Beginning with interval 3, Class E dramatically increased its task attention percentage and levelled off for the remainder of the project. From this point on Class E's task attention percentage was always significantly higher than that attained by Class C. Class C's task attention percentage dropped rapidly during intervals 2 and 3, improved during interval 4 but fell from three to thirteen percentage points below Class E from interval 2 on.

A trend analysis was performed on the four week mean task attention percentages for Class E and Class C. The results of this analysis appear in Table 7. The significant F for "E-C" indicates that the overall means for the two classes were significantly different. The F for "trials" shows that the eight four week means for both groups together is a significant trend. It is the F for the interaction between"trials" and "E-C" which is most interesting. This indicates that the trends for the two groups were significantly different. The F's for the linearity of trend indicate that though there is a significant non linear component, the two trends are basically linear and significantly different.

It is also evident from an examination of Figure 2 and Table 7 that the trend for Class E is increasing while that for Class C is constant or slightly decreasing.

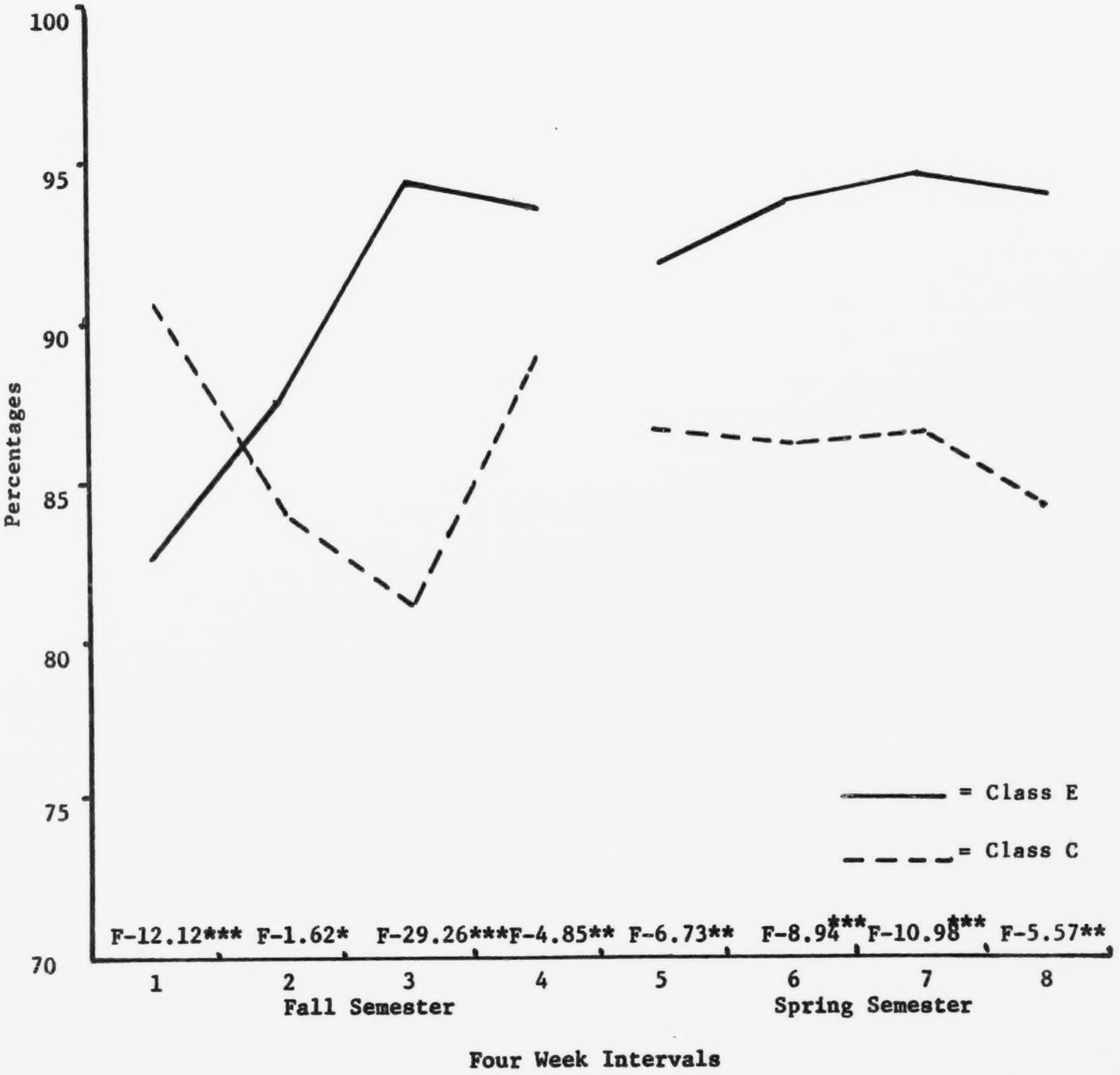
We turn now to presentation of results bearing on the second main question of the evaluation.

What is the effect of rigid adherence to the engineered classroom design and use of a token and tangible reward system on educationally handicapped children who previously have been in a small individualized class which did not use such a reward system?

Classes CE began the project with the control condition and introduced the experimental condition at mid year. Children in these classes were initially exposed to a highly individualized instructional program which may or may not have used aspects of the engineered classroom design but were not

Figure 2

Graph of Class E and Class C Mean Task
Attention Percentages Averaged for Four
Week Intervals During the Fall and Spring Semesters



*ns
** p.< .05
*** p.< .01

Table 7

Analysis of Variance Indicating Trends for Class E and Class C Using Eight Four Week Mean Task Attention Percentages

Source of Variation	df	Sums of Squares	Mean Square	F
Between Subjects				
E-C	1	1081.22	1081.22	9.85**
Subjects Within Groups	13	1427.35	109.80	
Within Subjects				
Trials	7	264,75	37.82	2.46*
Trials x EC	7	1162.59	166.09	10.79*
Linear Trend	1	545.62	545.62	35.44**
Other	6	616.98	102.83	6.68**
Trials x Subjects Within Groups	91	1400.96	15.40	
	119			

$* \ p < .05$
$** \ p < .01$

given systematic token or tangible rewards. During the Fall semester, these classes were similar to Class C which began with the control condition and maintained it all year. Therefore Class C functioned as a control class for Classes CE during the Spring semester. Differences between these two groups would offer evidence regarding the effect of adding the engineered design to a small class already underway.

Classes CE and Class C were compared on the four achievement test variables as well as task attention. The achievement test means for these classes appear in Tables 3 and 8. An analysis of variance was done with the achievement test means obtained at mid year (when both groups were similar) and at the close of the year (after Classes CE had changed to the experimental condition). No significant F's were obtained with any of the achievement test mean comparisons except arithmetic fundamentals. Table 9 presents the analysis of variance table for arithmetic and indicates Classes CE made a significant gain over Class C during the Spring semester. Starting with a 3.7 grade equivalent in arithmetic fundamentals at mid year. Class CE moved to a mean of 4.5 (semester gain of .8 year). Class C made only a .1 year gain during the Spring semester.

The gain made in arithmetic fundamentals by Classes CE during the Spring semester (.8 year gain) was significantly greater than the gain these classes made during the Fall (.2 year gain). Table 10 presents the t value for this comparison and reveals that there were no significant differences between Fall and Spring semester gains on other achievement tests by Classes CE.

In order to compare Classes CE with Class C on task attention percentages, these percentages were averaged for the last nine weeks of the Fall semester when both groups were the same and again for the last nine weeks of the Spring semester when they were different. An analysis of variance of these means revealed that Classes CE had made significant gains in task attention percentage over the Spring semester as compared with Class C which maintained the control dondition during this time. Table 11 presents the analysis of variance data for this comparison.

Table 8

Means and Standard Deviations for Classes EC and EC on Achievement Tests

Test	Pre				Mid				Post			
	EC		CE		EC		CE		EC		CE	
	M	σ	M	σ	M	σ	M	σ	M	σ	M	σ
WRAT Spelling	29.2	7.2	29.6	5.5	25.9	8.6	28.1	9.8	30.9	7.0	31.1	6.3
WRAT Reading	43.3	14.7	48.1	12.0	42.4	13.6	46.5	14.6	48.6	14.0	50.7	12.6
CAT Total Reading	28.1	28.3	24.8	16.6	32.9	23.3	33.4	17.4	35.9	29.3	37.8	19.3
CAT Arith. Fund.	10.7	6.4	11.1	7.0	15.2	8.4	13.5	10.1	19.8	9.3	19.7	9.9

Table 9

Analysis of Variance for Classes CE and Class C on CAT Arithmetic Fundamentals Gains During Spring Semester (mid to post)

Source	df	Sums of Squares	Mean Square	F
CE-C	1	135.00	135.00	4.83*
Indiv. Differences	18	502.80	27.93	
Total	19	637.80		

*p < .05

Table 10

Table of t tests for Pre-Mid Versus Mid-Post Mean Difference Scores for Classes CE on Achievement Tests

Test	Fall (Pre-Mid)	Spring (Mid-Post)	Difference	t	sig.
WRAT Spelling	-2.57	2.57	5.14	1.07	ns
WRAT Reading	-1.00	3.92	4.92	.95	ns
CAT Total Reading	7.23	4.53	-2.69	.98	ns
CAT Arith. Fund.	2.00	7.61	5.61	2.89	p<.05

The task attention percentages of Classes CE and C were also compared during the eight four week intervals of the entire project. Figure 3 graphs the mean task attention percentages attained by Classes CE and Class C for the year. Values of t obtained in the comparison of mean task attention percentages also appear in each interval. Class C achieved a significantly higher task attention level than Class CE during interval 1. This however was narrowed during intervals 2 and 3 but reappeared in interval 4. The classes were not significantly different on this dependent variable during interval 5 at the beginning of the Spring semester. Classes CE attained a significantly higher level during the remainder of the semester.

Comparing Classes CE with respect to task attention percentages achieved the last nine weeks of the Fall semester under the control condition with those obtained the last nine weeks of the Spring semester under the experimental condition produced the data presented in Table 12. The t value obtained is significant. Therefore introduction of the experimental condition in Classes CE resulted in a definite improvement in task attention among students in these classes (mean gain 8.82).

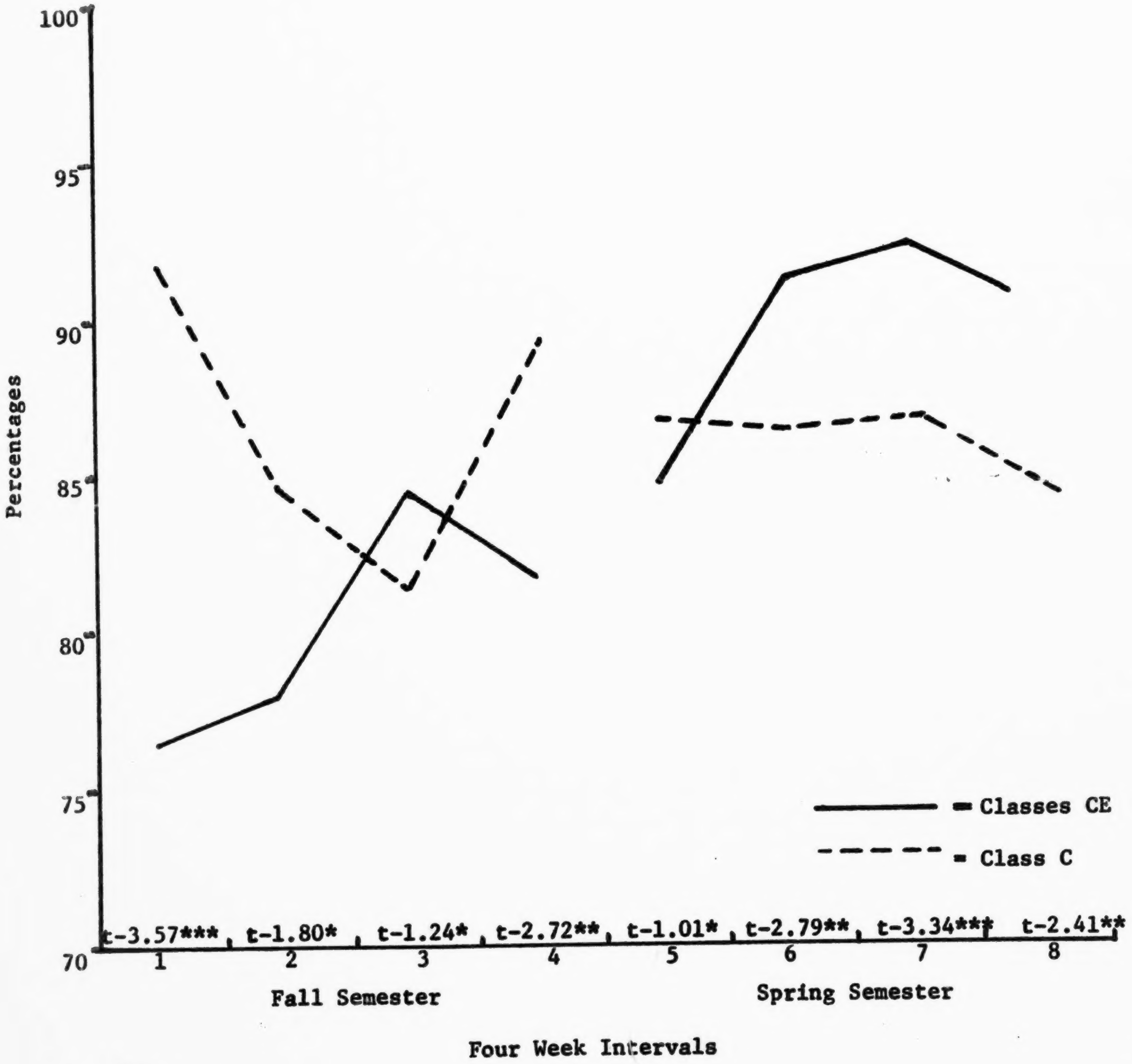
The final question under consideration in the evaluation was: What will be the effect of abruptly withdrawing the complete engineered design including the reward system from a class of educationally handicapped children which has become accustomed to it?

Classes EC began the project utilizing the engineered design or experimental condition and withdrew the token and tangible reward system along with other aspects the teacher chose to change without warning at the start of the Spring semester. During the Fall semester these classes were similar to Class E (which maintained the year long experimental condition) and during the Spring semester this class served as a control. The achievement test means appearing in Tables 3 and 8 for Classes EC and Class E were compared between mid year when the classes were similar and the close of the project when Classes EC had introduced the control condition. A series of analyses of variance with the data revealed that Classes EC and Class E did not differ significantly on any of the achievements tests from the mid to post points in the project.

Table 13 presents data comparing the achievement test mean difference scores obtained by Classes EC in the Fall with those obtained in the Spring. None of the 5 values are significant and hence achievement test gains made by students in these classes were not significantly affected by the change in classroom conditions.

Figure 3

Graph of Classes CE and Class C Mean Task Attention Percentages
Averaged for Four Week Intervals During the
Fall and Spring Semesters



*ns
p** $<$ .05
p***$<$.01

Table 11

Analysis of Variance for Classes CE and Class C on Mean Task Attention Percentages Last Nine Weeks of Fall Semester Versus Gains Last Nine Weeks of Spring Semester

Source	df	Sums of Squares	Mean Square	F
CE-C	1	305.92	305.92	8.71*
Indiv. Differences	18	631.87	35.10	
Total	19	937.79		

$p < .01$

Table 12

Table of t value for Mean Task Attention Percentages Last Nine Weeks of Fall Semester Versus Last Nine Weeks of Spring Semester for Classes CE

Fall Semester (last nine weeks)	Spring Semester (last nine weeks)	Difference	t	sig.
82.53	91.35	8.82	5.64	$p < .01$

Table 13

Table of t Tests for Pre-Mid Versus Mid-Post Mean Difference Scores for Classes EC on Achievement Tests

	Fall Pre-Mid	Spring Mid-Post	Difference	t	sig.
WRAT Spelling	-3.93	5.68	9.62	2.06	ns
WRAT Reading	-1.00	6.37	7.37	1.41	ns
CAT Total Reading	7.33	6.66	-.67	.10	ns
CAT Arith. Fund.	4.60	4.13	-.46	.23	ns

Mean task attention percentage comparisons between Classes EC and Class E are graphed in Figure 4. No significant difference was found when means obtained the last nine weeks of both project semesters were subjected to an analysis of variance.

The task attention percentages for Classes EC and Class E were also compared during each of the eight four week intervals of the project. Figure 4 reports the t values obtained from these comparisons. The groups were not significantly different during intervals 1 and 2 but Class E attained a significantly higher task attention percentage during intervals 3 and 4. This was maintained during the first portion of the Spring semester (intervals 5 and 6) but for the final intervals, 7 and 8, no significant difference was found.

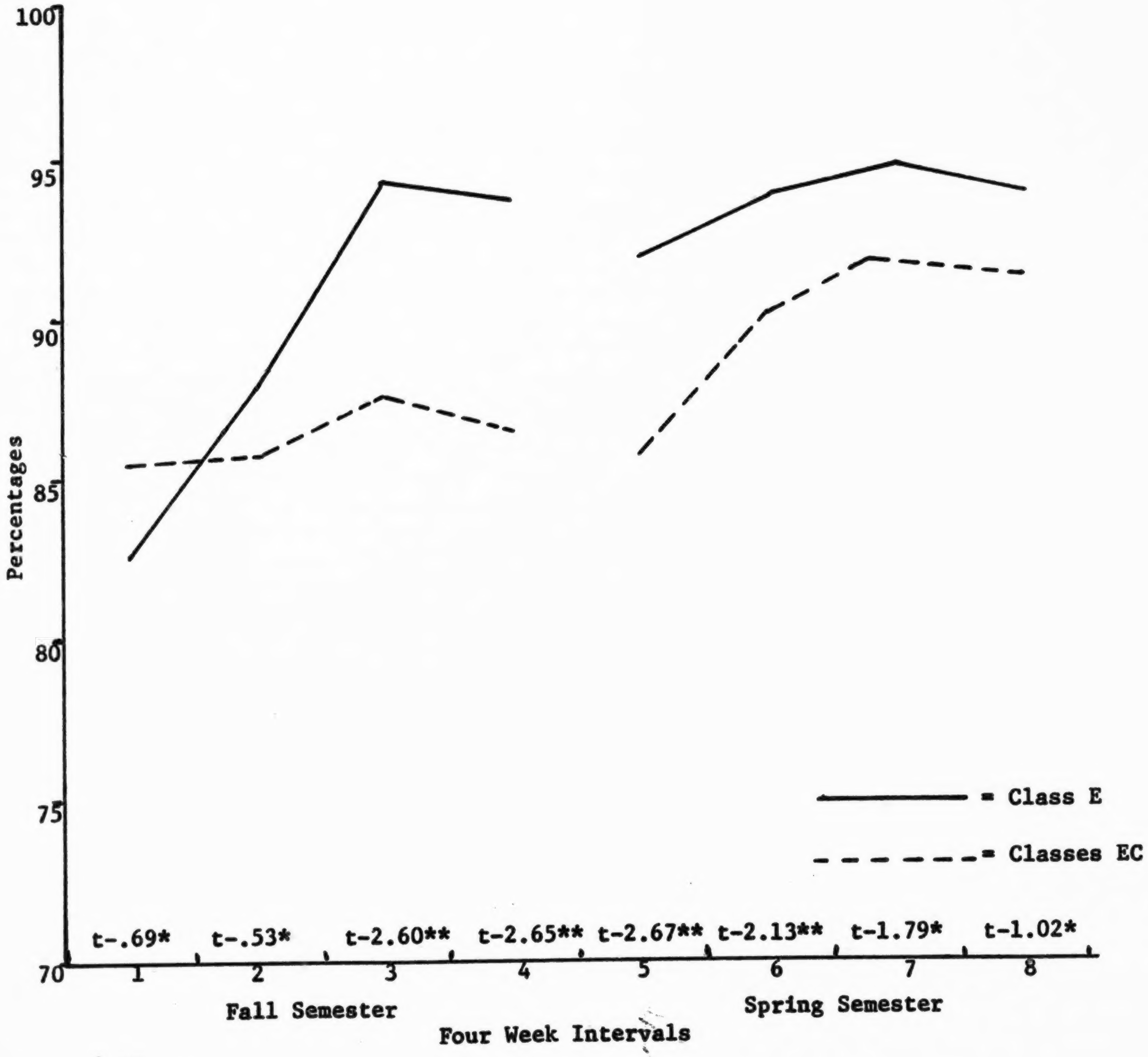
Table 14 reports the mean task attention percentage attained by Classes EC during the last nine weeks of the Fall semester when they were maintaining the experimental conditions as compared with the last nine weeks of the Spring semester when they had dropped it. The t value is significant indicating that Classes EC actually improved in task attention percentages during the last part of the Spring semester under the control condition.

An analysis of variance was done to evaluate the comparative mean task attention percentage gains made by Classes EC and CE during the last nine weeks of the two project semesters. Table 15 reports this analysis of variance and Table 16 the means and standard deviations upon which it is based. Class CE made a significantly higher gain in task attention than EC over the Spring semester.

Classes EC and CE were also evaluated by means of t tests during each four week interval of the project as shown in Figure 5. During intervals 1 and 2 Classes EC were significantly higher in task attention than Classes CE. There was no significant difference in interval 3 but one favoring Classes EC appeared again during interval 4. Over the Spring semester (intervals 5,6,7, and 8) the classes attained quite similar task attention percentages and no significant differences were found.

Figure 4

Graph of Classes EC and Class E Mean Task Attention Percentages Averaged for Four Week Intervals During the Fall and Spring Semesters



* ns
** $p < .05$
*** $p < .01$

Table 14

Table of t value for Mean Task Attention Percentages Last Nine Weeks of Fall Semester Versus Last Nine Weeks of Spring Semester for Classes EC

Fall Semester (last nine weeks)	Spring Semester (last nine weeks)	Difference	t	sig.
87.56	91.40	3.84	2.91	$p < .05$

Table 15

Analysis of Variance for Classes CE and EC On Mean Task Attention Percentages Last Nine Weeks Of Fall Semester Versus Last Nine Weeks of Spring Semester

Source	df	Sums of Squares	Mean Square	F
CE-EC	1	278.30	278.30	10.07*
Indiv. Differences	29	801.29	27.63	
Total	30	1079.59		

*$p < .01$

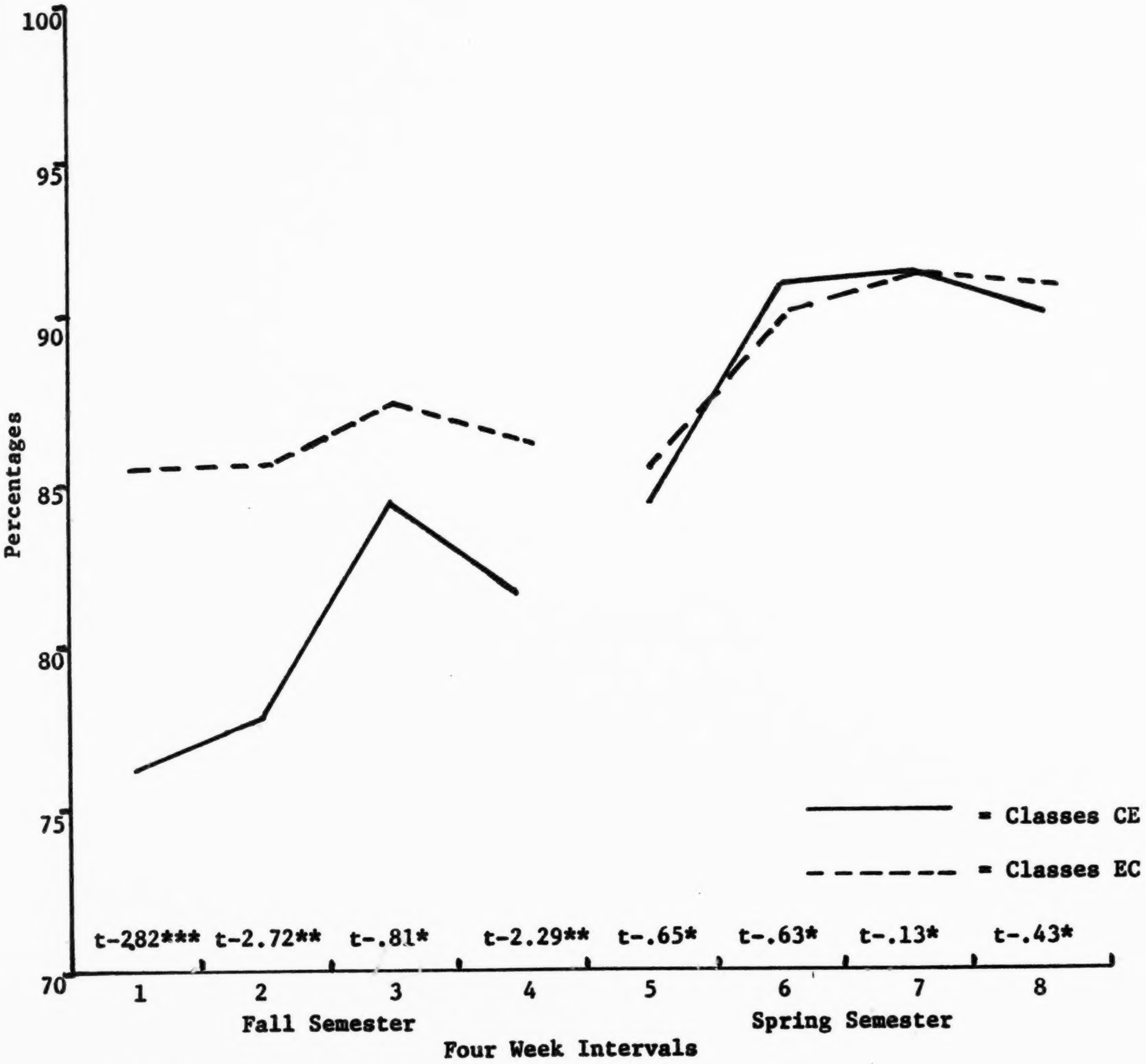
Table 16

Means and Standard Deviations for Classes EC and CE on Mean Task Attention Percentages Last Nine Weeks of Fall Semester Versus Last Nine Weeks of Spring Semester

Fall Semester (last nine weeks)				Spring Semester (last nine weeks)			
EC		CE		EC		CE	
M	σ	M	σ	M	σ	M	σ
87.6	6.3	82.5	6.4	91.4	3.9	91.3	3.1

Figure 5

Graph of Classes EC and Classes CE Mean
Task Attention Percentages Averaged for Four Week Intervals
During the Fall and Spring Semesters



* ns
** $p < .05$
*** $p < .01$

CHAPTER IV

Conclusions

In the section which follows we shall discuss the differences in gains in arithmetic fundamentals made by project classes, changes in task attention occurring among groups, the impact of the classroom conditions on students and conclusions and implications which may be drawn from the evaluation.

A consistent finding in the evaluation was that the presence of the experimental condition was positively correlated with student achievement level in arithmetic fundamentals as measured by the California Achievement Test. Class E attained a significant improvement in arithmetic as compared with Class C over the year. Classes CE made significantly greater gains in arithmetic during the Spring semester when they introduced the experimental condition than they had made during the Fall semester when they maintained the control condition. They also made significant gains during the Spring semester as compared with the year long control Class C. Classes EC made approximately the same gains in arithmetic during the Fall semester when they introduced the experimental condition as they had during the Spring semester when they withdrew it.

In the Santa Monica Project, one hour daily was set aside for arithmetic (the second hour in the morning) and all experimental and control classes adhered to this schedule. Differences in the emphasis which teachers place on arithmetic and their competencies for teaching it are obvious determinants of arithmetic gains made by their students. However, the significant arithmetic improvement made by classes following the experimental condition as compared with those using the control condition suggest that the teacher variable was not alone responsible. The nature of the experimental condition with its 15-minute work periods followed by check marks may have been conducive to more consistent work efforts on the part of children in a class operating under this condition. The routine of the class which emphasized putting everything in its place, following directions, having all work corrected each 15 minutes and even counting the daily check marks may well have supported improvement in arithmetic skills. From an observational viewpoint the author was impressed with the amount of time teachers under the control condition spent in handling behavior problems during academic work periods. This took away from actual teaching time available and may have limited the amount of individual remedial help given to students. Children in classes using the experimental condition were observed to work better independently and for longer periods of time without distraction. The task attention data to be discussed later supports this observation.

Classes EC did not show a significant difference in their degree of improvement in arithmetic during the Fall semester as compared with the Spring semester. Their gains, much like those of Class E, were similar during both the Fall and Spring semesters as shown in Tables 3 and 8. This may be a reflection of the advantage of starting with the experimental condition and establishing a structured working routine which then carries over one semester to the next regardless of changes made such as removal of the check mark system.

An evaluation of academic gains made by children in educationally handicapped classes in California has been reported by Safford and Watts (1967). Thirty children grouped in three classes with 10 students in each were given the WRAT spelling, reading, and arithmetic sections at the beginning and again at the close of the school year. These children fell approximately in the same age and IQ ranges as the children in the Santa Monica project. They also qualified for inclusion in a state subsidized class for the educationally handicapped but were considered to be primarily suffering from minimal neurological difficulties rather than emotional disturbance. Despite the differences in diagnosis and the fact that these classes utilized a sensory-neurological strategy, a comparison of academic gains made by the children in this study and those in the Santa Monica Project is interesting. Safford and Watts indicate an overall mean academic gain of .3 of a year was made in all subject areas. The present evaluation (using only the WRAT spelling and reading along with the CAT reading and arithmetic fundamentals) found a similar mean gain in WRAT spelling and reading but a .95 mean year gain in CAT arithmetic for all children (Classes E,C,EC and CE combined). The smallest gain (.5 years) was made by the Class C and the largest by Classes E and EC (1.2 years). Total mean CAT reading gains for the combined groups over the year was .55.

The experimental condition in the Santa Monica Project had a facilitating effect on student task attention as illustrated in Figure 5. In Figure 2 we see how Class E overcame in initial disadvantage as compared with Class C during the earlier part of the Fall semester and repeatedly attained a significantly higher task attention percentage than Class C over the remainder of the year. In this respect, the initial four week interval of the Fall semester is interesting to consider. All project teachers were trained in the use of the developmental sequence and the engineered classroom design prior to random assignment to either experimental or control classrooms. The teacher in Classroom C was particularly interested in this approach to the education of emotionally disturbed children and sought to implement as much of it as possible while adhering to the control condition which precluded the use of the check mark system. Her efforts are reflected in the 90% mean task attention percentage level her class attained during the initial portion of the semester.

The authors were impressed with her application of behavior modification techniques using exploratory, social and mastery level emphasis. While no check marks or candy were present in her program, she effectively provided many high interest arts and crafts projects, games and other appealing exploratory activities, in addition to continual social attention and praise. The teacher in Class E and the two teachers in Classes EC during the Fall semester had to get used to a unique system of fifteen minute work periods, check mark giving and regular use of classroom interventions. During the first few weeks which it took for these routines to be established for both teachers and children in Classes E and EC their task attention percentage level was below that of Class C. By the second four week interval, however, both classes had attained a slightly higher task attention percentage as reflected in Table 6. From that point on (with one exception during interval four, when Classes EC were slightly below Class C) Class E and Classes EC maintained their task attention advantage utilizing the experimental condition. The teacher in Class C encountered more difficulty in maintaining her initially higher level due to what seemed a diminishing effectiveness of exploratory, social and mastery rewards with her students. The more basic attention, response, and order reward system inherent in the engineered classroom design, while slower to achieve effectiveness, appears to have greater long-range benefits than use of higher level rewards initially. The initial significant difference in task attention between Class C and Classes CE during interval 1 of the Fall semester would appear a reflection of the teacher variable in these classes and the greater success enjoyed by the teacher in Class C in the use of exploratory, social and mastery rewards.

That "launching" children by use of the engineered design moves them up the developmental sequence and makes them susceptible to maintenance of a consistently high task attention level without the use of check marks and rigid adherence to the engineered design is suggested by Figure 4, which depicts the task attention gains made by Classes EC as teachers gave up the check mark system and relied on exploratory, social and mastery rewards during the Spring semester. These gains were apparently not due to time and enrollment in a small individualized class alone for the task attention percentages attained during the control phase of Classes EC were consistently superior to those of Class C during the same period. In addition, Class E reached its peak task attention level in interval 3 and leveled off for the remainder of the year rather than demonstrating a second semester increase. The sharp increase in task attention percentage displayed by Classes CE when the experimental condition or engineered design was introduced during the second semester offers further evidence of the facilitating effect of the design on children who had been accustomed to a small class.

The dependent variable of task attention was selected primarily as a measure of student functioning on the attention, response and order levels of the developmental sequence. One of the hypotheses advanced throughout this text has been that getting children ready for learning through emphasis on fundamental competencies in learning is extremely important. Such a readiness training goal is basic to the design of the engineered classroom and the evidence obtained from the evaluation suggests: (1) that there is a positive relationship between the design and improved task attention functioning and (2) once an investment is made in building attention, response and order behaviors the child naturally moves to higher levels on the developmental sequence and does not need the continuous support of the check mark system, tangible rewards for learning, or emphasis on routine.

The validity of task attention as a measure of learning or performance may be questioned by some. Eye, head or body orientation toward a task does not reflect whether or not the student is actually working on the assignment, whether he understands what he is doing or whether he is making academic progress from day to day. The possibility that a given child may be daydreaming even though his eyes are on the task also cannot be ruled out. Despite these limitations, the assumption that a child is attending, responding, and following directions when his eyes are directly on a task (or in some cases, when his head or body are properly oriented toward it) is considered reasonable and warranted. "Task attention" is not a qualitative measure of learning but it has definite quantitative advantages with respect to assessing the three lowest levels of the developmental sequence. In addition, the high degree of observer reliability which is possible using this direct behavioral measurement allows discussion with some certainty if differences are found between experimental and control conditions.

The author was aware when formulating the evaluation of the Santa Monica Project that one explanation of any change which might occur among the students would relate to the "Hawthorne effect." Several decades ago evidence was provided by Roethlisberger and Dixon (1939) that changes in working conditions initially improved worker morale and subsequent performance level. Since that time the immediate positive effects derived from introducing novelty or change into a working situation has come to be known as the "Hawthorne effect". At the beginning of the Santa Monica Project, all students were exposed to a powerful novelty effect. Coming into a small class with two teachers after having been in regular classrooms with 30 or 35 other students, where instruction was group oriented, where grade level curriculum was emphasized along with competition and grades, constituted a marked modification of working and learning conditions in school. While Figures 2 through 5 reflect four week interval mean task attention percentages, and daily and weekly measures are not reported, such data did indeed offer evidence that in all classes the first few days, or in some cases, the first few weeks when a new condition was introduced produced a task attention advantage which diminished to varying degrees immediately following. At the start of the second semester when Classes EC withdrew the check mark system and tangible rewards, they too experienced such an initial spurt which quickly diminished. Here is an example of the effect of "taking away" what would seem to be a highly desirable element in the classroom but which nevertheless altered the working conditions and produced a positive result. The continued improvement of Classes EC over this semester has been discussed previously in relation to the increased effectiveness of exploratory, social and mastery rewards rather than the removal of the check mark system and tangible rewards alone. Such continued gains cannot be explained merely as the result of the Hawthorne effect.

The full year duration of the Santa Monica Project provided an opportunity for a thorough assessment of the Hawthorne effect. Class E maintained a high level of task attention over the major portion of the year; certainly a larger one than would be accountable for on the basis of novelty alone. Classes EC immediately improved in task attention the first few days when the engineered design was introduced during the Spring semester but this diminished soon after. Their consistent improvement from that point on is viewed as the result of the attention, response and order emphasis introduced through the experimental condition or engineered design.

One of the pieces of missing information in the evaluation is a base line measure of the task attention level of the project children the previous year while they were all in regular classes. While no systematic or long range observations were made, three of the children were timed for a brief period at the close of the semester prior to the project and task attention percentages of from 27 to 33 per cent obtained. This suggests that all six project classes were successful to a considerable degree in improving the task attention functioning level of their students.

The engineered design, however, may well have included additional positive and rewarding elements through its check mark system and emphasis on the most fundamental levels of the developmental sequence. Certainly the results of the evaluation answer some critic's claim that use of tangible rewards in the classroom dooms the child to dependence on them. The evidence obtained indicates that emotionally disturbed children can and do move on to responding positively to more traditional rewards such as multi-sensory experiences, social praise and knowledge of results. Again it should be emphasized that the use of tangible rewards alone is not enough. It is their inclusion in a well-organized, consistent, process such as the check mark system that makes them of real value.

The engineered classroom design appears basically a launching technique for initiating learning with children who often fail to "get off the ground" in school. It does not appear to be essential in its present form for more than one semester with many children and indeed as additional work is done it may be found that children profit from it primarily the first few weeks of the program after which they are ready to move on to a more traditional learning environment. Efforts need to be made to assess transition usage of the reward system such as having the child start the semester receiving check marks and tangible exchange items, then moving on in six to eight weeks to exchanging the check marks for privilege time at the exploratory, art, communication or order areas and finally moving to merely graphing the check marks on a Work Report as a form of "grade." This means of modifying rewards parallels the developmental sequence and moves from the attention to the exploratory and finally the mastery level.

Teachers of children with emotional, behavioral and learning problems in one way or other have been doing many of the things included in the engineered classroom for years. That they have not always experienced success with such difficult children may be largely due to a need to re-focus on readiness training and the value of a systematic approach for launching children into learning. Such a re-orientation of teachers and emphasis on systematically helping children get ready for school while they are actually there was the major purpose of the Santa Monica Project.

APPENDIX I

STUDENT ASSESSMENT ACCORDING TO A DEVELOPMENTAL SEQUENCE OF EDUCATIONAL GOALS
Frank M. Hewett, Ph.D.
University of California, Los Angeles

Assessment dates ____________ Type of situation in which child observed ____________

3. ____________ ____________

2. ____________ ____________

1. ____________ ____________

Student ____________

Birthdate ____________

Grade ____________

Teacher ____________

STRUCTURE (Degree of teacher control)

ACHIEVEMENT							Not rewarded by acquiring knowledge and skill g.	A
MASTERY						Functioning in self-care & intellectual skills below capacity 21.	Not rewarded by doing learning tasks correctly f.	Ach.
SOCIAL					Does not gain approval from others 19.	Overly dependent on others' attention or praise 20.	Not rewarded by approval & avoidance of disapproval e.	
EXPLORATORY				Does not adequately explore environment 16.	Dependent on others for interests & activities 17.	Motor, physical, sensory, perceptual or intellectual deficits 18.	Not rewarded by multisensory experiences in learning. d.	Med./c
ORDER			Does not follow directions 12.	Uncontrolled in learning 13.	Disruptive in group 14.	Does not finish learning tasks. 15.	Not rewarded by finishing learning tasks c.	
RESPONSE		Does not respond to learning tasks 7.	Performance level constricted 8.	Exhibits narrow range of learning interests 9.	Withdraws from teacher & peers 10.	Cannot function in regular classroom 11.	Not rewarded by social attention b.	
ATTENTION	Does not pay attention to learning tasks. 1.	Prefers fantasy to reality 2.	Repetitive behavior interferes with learning 3.	Beliefs & interests inappropriate 4.	Does not pay attention to teacher 5.	Does not profit from instruction 6.	Not rewarded by tangible reward ($, food) in learning a.	

Revised, October, 1967 TASK REWARD

	Additional Information	Instructional Implications
re- g. ded by uiring wledge ll		
re- f. ded by ng learn- tasks rectly	**Ach. test data:**	
e. arded by proval & idance of approval		
t d. warded by ltisens- y exper- nces in arning.	Med./diag. data:	
t c. warded by nishing arning sks		
t b. warded social tention		
t a. warded by ngible re rd($ food) learning		

REWARD

STUDENT ASSESSMENT ACCORDING TO A DEVELOPMENTAL SEQUENCE OF EDUCATIONAL GOALS

Inventory

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TASK

Attention

1. Child does not pay attention to learning tasks.

☐ (always)	☐ (sometimes)	☐ (rarely)
Child never pays attention to learning tasks	Child often does not pay attention to learning tasks	Child occasionally does not pay attention to learning tasks.

2. Child prefers fantasy to reality.

☐ (severe)	☐ (moderate)	☐ (mild)
Child out of contact with reality.	Child often daydreams	Child occasionally daydreams

3. Child engages in repetitive behavior which interferes with learning.

☐ (severe)	☐ (moderate)	☐ (mild)
Child preoccupied with constant self-stimulation.	Child preoccupied with rituals or other compulsive behavior.	Child preoccupied with neatness, cleanliness or correctness.

4. Child's beliefs and interests are inappropriate.

☐ (severe)	☐ (moderate)	☐ (mild)
Child has extremely bizarre beliefs and interests.	Child has distorted beliefs about his environment.	Child's beliefs and interests immature for sex and age.

REVISED, October 1967.

5. Child does not pay attention to teacher.

☐ (always)	☐ (sometimes)	☐ (rarely)
Child never pays attention to teacher.	Child often does not pay attention to teacher.	Child occasionally does not pay attention to teacher.

6. Child does not profit from instruction.

☐ (always)	☐ (sometimes)	☐ (rarely)
Child never retains and uses instruction he has been given.	Child often does not retain and use instruction he has been given.	Child occasionally does not retain and use instruction he has been given.

Response

7. Child does not respond to learning tasks.

☐ (always)	☐ (sometimes)	☐ (rarely)
Child will never undertake a learning task.	Child often will not undertake a learning task.	Child will occasionally not undertake a learning task.

8. Child maintains a constricted level of performance.

☐ (always)	☐ (sometimes)	☐ (rarely)
Child always controlled and rigid with learning tasks.	Child often controlled and rigid with learning tasks.	Child occasionally controlled and rigid with learning tasks.

9. Child exhibits a narrow range of learning interests.

☐ (always)	☐ (sometimes)	☐ (rarely)
Child will never try a new or different learning task.	Child often will not try a new or different learning task.	Child occasionally will not try a new or different learning task.

10. Child withdraws from teacher and peers.

☐ (always)	☐ (sometimes)	☐ (rarely)
Child always avoids contact with teacher and peers.	Child often avoids contact with teacher and peers.	Child occasionally avoids contact with teacher and peers.

11. Child cannot function in a regular classroom.

☐ (severe)	☐ (moderate)	☐ (mild)
Child does not respond to tasks in individual tutoring.	Child does not respond to tasks in a special class or program.	Child does not respond to tasks in a regular classroom except for brief periods of time.

Order

12. Child does not follow directions.

☐ (always)	☐ (sometimes)	☐ (rarely)
Child never follows directions when doing learning tasks	Child often does not follow directions when doing learning tasks.	Child occasionally does not follow directions when doing learning tasks.

13. Child is uncontrolled in learning.

☐ (always)	☐ (sometimes)	☐ (rarely)
Child always approaches learning tasks in an impulsive, uncritical manner.	Child often approaches learning tasks in an impulsive, uncritical manner.	Child occasionally approaches learning tasks in an impulsive, uncritical manner.

14. Child is disruptive in group.

☐ (always)	☐ (sometimes)	☐ (rarely)
Child always is disruptive in group.	Child often is disruptive in group.	Child occasionally is disruptive in group.

15. Child does not finish learning tasks.

☐ (always)	☐ (sometimes)	☐ (rarely)
Child never finishes learning tasks.	Child often does not finish learning tasks.	Child occasionally does not finish learning tasks.

Exploratory

16. Child does not adequately explore his environment.

☐ (always)	☐ (sometimes)	☐ (rarely)
Child's exploration of his environment is extremely limited.	Child's exploration of his environment moderately limited.	Child's exploration of his environment limited to a few specific areas.

17. Child overly dependent on others for choice of interests and activities.

☐ (always)	☐ (sometimes)	☐ (rarely)
Child completely dependent on others for choice of interests and activities.	Child excessively dependent on others for choice of interests and activities.	Child usually dependent on others for choice of interests and activities.

18. Child cannot do learning tasks because of motor, physical, sensory, perceptual or intellectual deficits.

☐ (severe)	☐ (moderate)	☐ (mild)
Child severely impaired by motor, physical, sensory, perceptual or intellectual deficits.	Child moderately impaired by motor, physical, sensory, perceptual or intellectual deficits.	Child mildly impaired by motor, physical, sensory, perceptual or intellectual deficits.

Social

19. Child does not gain approval from others.

☐ (severe)	☐ (moderate)	☐ (mild)
Child never gains approval from others.	Child often does not gain approval from others.	Child occasionally does not gain approval from others.

20. Child overly dependent on attention and praise from others.

☐ (severe)	☐ (moderate)	☐ (mild)
Child will only work with constant supervision and attention from teacher.	Child will only work for brief periods of time without attention and praise from others.	Child often seeks attention and praise from others while doing learning tasks.

Mastery

21. Child's functioning level in self-care and intellectual skills below capacity.

(self-care)

◸	◸	◸
(severe)	(moderate)	(mild)
Extreme discrepancy between child's capacity and functioning level in self-care.	Considerable discrepancy between child's capacity and functioning level in self-care.	Slight discrepancy between child's capacity and functioning level in self-care.

(intellectual skill)

◿	◿	◿
(severe)	(moderate)	(mild)
Extreme discrepancy between child's capacity and functioning level in intellectual and academic skills.	Considerable discrepancy between child's capacity and functioning level in intellectual and academic skills	Slight discrepancy between child's capacity and functioning level in intellectual and academic skills.

REWARD

a. Child not rewarded by tangible rewards (e.g. food, money) in learning.

☐	☐	☐
(always)	(sometimes)	(rarely)
Child's responses never controlled by tangible rewards.	Child's responses often not controlled by tangible rewards.	Child's responses occasionally not controlled by tangible rewards.

b. Child not rewarded by social attention in learning tasks.

☐	☐	☐
(always)	(sometimes)	(rarely)
Child's responses never controlled by social attention.	Child's responses often not controlled by social attention.	Child's responses occasionally not controlled by social attention.

c. Child is not rewarded by finishing learning tasks.

☐	☐	☐
(always)	(sometimes)	(rarely)
Child's performance never controlled by task completion.	Child's performance often not controlled by task completion.	Child's performance occasionally not controlled by task completion.

d. Child not rewarded by multi-sensory experiences in learning.

☐	☐	☐
(always)	(sometimes)	(rarely)
Child's responses never controlled by multi-sensory rewards.	Child's responses often not controlled by multi-sensory rewards.	Child's responses occasionally not controlled by multi-sensory rewards.

e. Child not rewarded by gaining approval and avoiding disapproval for learning tasks.

☐	☐	☐
(always)	(sometimes)	(rarely)
Child's responses never controlled by social approval and disapproval.	Child's responses often not controlled by social approval and disapproval.	Child's responses occasionally not controlled by social approval and disapproval.

f. Child not rewarded by doing learning tasks correctly.

☐	☐	☐
(always)	(sometimes)	(rarely)
Child's responses never controlled by knowledge of results.	Child's responses often not controlled by knowledge of results.	Child's responses occasionally not controlled by knowledge of results.

g. Child not rewarded by acquiring knowledge and skill.

☐	☐	☐
(always)	(sometimes)	(rarely)
Child's performance never controlled by acquisition of knowledge and skill.	Child's performance often not controlled by acquisition of knowledge and skill.	Child's performance occasionally not controlled by acquisition of knowledge and skill.

APPENDIX II

AN ENGINEERED CLASSROOM DESIGN FOR EMOTIONALLY DISTURBED CHILDREN

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J. Hellmuth, Editor, Special Child Publications,
Seattle, Washington)

Once a society dedicates itself to the goal of providing educational opportunities for all individuals and possesses the resources for fulfilling such a goal, growing concern may be expected when certain individuals fail to respond and learn by traditional methods. During the past two decades as special education in this country has struggled toward maturity, one group which has aroused concern, particularly in the public schools, is the emotionally disturbed. Children acquire the label of "emotionally disturbed" when their deviate behavior in a learning situation cannot be explained on the basis of physical, sensory, neurological, intellectual or disadvantaged factors. It is a nebulous label with many meanings and it covers a multitude of problem behaviors including inattention, withdrawal, acting out, immaturity, and interpersonal conflicts.

This chapter reports on an approach still in the experimental stage which attempts to extend sound educational practice so that many children labeled "emotionally disturbed" can be included rather than excluded from public school and learn more efficiently in the classroom.(5) The approach was suggested by the work of Bijou and others with institutionalized retardates.(2) It was modified for use with emotionally disturbed children in the Neuropsychiatric Institute School in the Neuropsychiatric Institute (NPI), a California State Department of Mental Hygiene facility located in the University of California, Los Angeles (UCLA) Center for the Health Sciences. The NPI School provides an educational program for inpatient children and adolescents hospitalized on the Children's Service of the NPI. These individuals are severely emotionally

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1. A part of the work reported herein was performed pursuant to a grant from the U. S. Office of Education, Department of Health, Education & Welfare.

disturbed and require 24-hour care and supervision.

Despite success in the NPI School setting, with the goals and methods to be described, the author was well aware that a far greater number of problem learners who were not so severely disturbed and who did not require hospitalization existed in the community and were dependent on the public schools for their education. This number has been estimated by Bower (3) to be as great as 10% of the entire school population. In an effort to assess whether or not the NPI School procedures were applicable to the public school the author attempted to enlist the support and cooperation of several school districts. Unfortunately, suggestions for innovation in education are often met with reactions of extreme caution and even mistrust and it was initially somewhat difficult to locate school districts willing to investigate a unique approach.

The Tulare County schools in California, however, provided the first opportunity for exploration,(4) during a five week summer session. During the next school year the Santa Monica Unified Schools initiated several classes in cooperation with the author. The following summer the University of Hawaii cooperated by setting up a demonstration class for five weeks with children from the Palolo School District in Honolulu.[1]

After these initial successes in a public school setting a large-scale opportunity for investigation, the engineered classroom design, was provided by the Santa Monica Unified School District in California. Dr. Alfred Artuso, Superintendent of the District, and Mr. Frank Taylor, Director of Special Services, expressed an interest in incorporating the engineered classroom design in the district-wide program for the educationally handicapped. The State of California encompasses children with emotional problems within this classification along with children manifesting minimal neurological impairment and learning disabilities. The Santa Monica Schools had previously utilized several other approaches with educationally handicapped children but none had proven wholly satisfactory. As a result, a unique university and public school liaison was established between the author and the Santa Monica Unified School District, based on research concerns for the development of more effective educational approaches with the emotionally disturbed and the demands placed on the public schools for more adequate service. A U.S. Office of Education Demonstration grant (OE Project 62893) was awarded to the author and the Santa Monica schools to assess the effectiveness of the engineered classroom design and Mr. Thomas Taglianetti appointed as coordinator for the project. In the later sections of this chapter many of the procedures and materials described were largely developed in this project and represent contributions made by the Santa Monica staff.

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[1] The author is indebted to Mr. Lou Rienzi and Mrs. Blanche Warson of the Tulare County Schools and Dr. George Fargo and Miss Sylvian You of the University of Hawaii for their contributions to the development of the engineered classroom design.

With this introduction to the development of the engineered classroom design we will discuss the nature of the educational problems presented by emotionally disturbed children, the goals and methods inherent in the design and then the specific operations and program of the engineered classroom itself.

Rabinow(7) has aptly called attention to the fact that emotionally disturbed children are often (1) not ready to be in school, (2) however ready to learn something and has further pointed out that the dilemma facing the educator is (3) getting such children ready to be in school while they are actually attending school.

The author has interpreted "not ready to be in school" in a broad context and considers a disturbed child who maintains appropriate behavior in the classroom but who is an inefficient learner "not ready". Being ready to learn implies the capacity to attend to learning tasks and the teacher, to retain information, to respond to a school learning situation, to follow directions, to conform to classroom limits, to readily explore the environment and function appropriately in relation to teachers and peers. The child who does not possess these capacities is in trouble in school.

The uselessness of the label "emotionally disturbed" for the teacher has been alluded to earlier. The entire practice of diagnostic labeling has perplexed and appalled many special educators including the author. Descriptions of children's behavior are inevitable in the process of attempting to understand and help them but when such descriptions are restricted to "second-hand" nomenclature borrowed from the psychiatrist, neurologist, pediatrician or clinical psychologist, it has little, if any, value in the classroom. In an attempt to link diagnosis and description with educational operations a developmental hierarchy of educational tasks has been conceived which delineates seven stages of learning and the tasks which must be accomplished at each level if efficient learning is to occur.

According to the hierarchy the child must learn to pay attention, respond in learning, order his behavior, explore his environment, and function appropriately as a member of a group if he is to master intellectual skills and achieve intrinsic motivation for learning. These levels overlap and the use of the hierarchical framework is primarily for expository purposes. The levels described are related to stages of development basic to the writings of Piaget, Freud, Erickson and Havighurst. By means of the hierarchy the emotionally disturbed child may be described in terms of his deficits in learning readiness.

Level-by-level the following tasks are of central importance:

LEVEL	TASKS
Attention	Attending to assignments.
	Preferring reality instead of fantasy.
	Attending to behavior which supports learning rather than ritualistic compulsive behavior.
	Having appropriate interests and beliefs.
	Attending to the teacher.
	Retaining information.
Response	Responding to assignments
	Not evidencing constriction in learning performance.
	Responding to a wide range of learning interests.
	Approaching teacher and peers.
	Responding in a classroom setting.
Order	Following directions.
	Displaying controlled behavior in learning.
	Functioning within classroom limits.
	Completing assignments.
Exploratory	Acquiring complete and accurate knowledge of the environment.
	Independent interest in exploring the environment.
	Being competent in sensory-motor exploration of the environment.

LEVEL	TASKS
Social	Obtaining the approval of others Not being overly dependent on the attention and praise of others.
Mastery	Utilizing intellectual capacity in self-care. Acquisition of intellectual and academic skills.
Achievement	Pursuing learning on the basis of intrinsic motivation.

Description of the child's behavior according to the hierarchy enables the teacher to replace "second-hand" diagnostic information with terms relevant for classroom instruction. For purposes of illustration the following parallels exist between certain traditional clinical diagnostic terms and the first four levels of the hierarchy.

Attention problems - autism, psychosis, schizophrenia.

Response problems - school phobia, neurotic traits, schizoid personality.

Order problems - primary behavior problems, conduct disturbance.

Exploratory problems - perceptual-motor dysfunction.

Of course, the problems manifested by schizophrenic children are not restricted to the attention level but often the primary task which must be accomplished by the teacher before learning can begin is to help such children learn to pay attention. Similar examples might be given with relation to problems of school phobia, conduct disturbance and perceptual-motor dysfunction.

The hierarchy of educational tasks assists the teacher in locating the "somethings", particularly the initial "something" the child needs to learn. The tasks on the lowest levels which the child has not accomplished have priority over those on higher levels. Children who are competent on the mastery and achievement levels but who lack adequate response, exploratory and social skills should be oriented toward the lower level even at the expense of academic assignments.

The major contribution of the hierarchy is to alert the teacher to deficits which interfere with the child's learning in school and to focus on emotionally disturbed children's difficulties within a "first-hand" educational rather than "second-hand" psychiatric context.

Two examples from the research literature will illustrate problems commonly displayed by emotionally disturbed children in school. Although these examples do not involve school-age children they will demonstrate why emotionally disturbed children are "not ready" to learn, the fact that they are "ready to learn something", and finally how to "get them ready to be in school while they are actually there".

The first example concerns Peter, a three-year-old participant in a famous experiment done by Jones during the 1920's.(6) Peter was a normal, healthy boy with one exception. He had an aversion toward rabbits and white, furry objects in general. When a rabbit was brought near Peter he exhibited extreme distress. In fact, at such times Peter was not ready to pay attention, respond, order his behavior, explore his environment, function appropriately with others, much less master intellectual tasks. Under such stress Peter's readiness for learning was reduced practically to zero.

Emotionally disturbed children often develop an aversion to the school setting which, like the rabbit for Peter, reduces their readiness to learn to a near zero level. School, however, is not a discrete stimulus but a collection of physical, emotional, intellectual and social cues, many of which converge on the child simultaneously.

Johnny must arrive in the classroom before 9:00 in order not to be tardy, hang his coat up on a hook with his name on it, place his lunch directly overhead, walk in an orderly manner to his desk, sit quietly, ignore the teasing and poking of Billy, his neighbor across the aisle, and pay attention to the teacher as she starts a spelling lesson, for he may be called on to recite without warning.

While normal children manage to take such stresses and expectations in their stride, the emotionally disturbed child may not be ready to deal with them and when the teacher arbitrarily imposes demands without any consideration of his lack of readiness to be in school in the first place, she is, in effect, demonstrating the same lack of understanding that might have been shown by an individual who directly confronted Peter with a rabbit and impatiently glared at him as he became upset and was unable to adjust to the situation. The case of Peter illustrates that regardless of our knowledge of the "somethings" children need to learn and are ready to learn, unless we give careful consideration to the manner in which we impose our demands on them we may fail before we start.

How can a child like Peter be helped to overcome his fear of rabbits and how can emotionally disturbed children be aided in getting ready for school while they are actually in school? Despite the apparent dissimilarity of problems, the measures taken to help Peter have direct relevance in the classroom. Peter was seated in a room at a table. On the table were many of his favorite foods, including ice cream and a selection of toys which appealed to him. He was immediately drawn to the food and toys, sat quietly and apparently was quite happy eating and playing. In fact, Peter was so content that he hardly noticed when a door, some distance away, was opened and someone stood there holding a rabbit. The rabbit was in the general vicinity of Peter but so rewarding and positive were the activities in which he was engaged that these positive stimuli dominated whatever negative stimuli might have been associated with the rabbit. The rabbit, however, was not brought in and given to Peter at this time. No doubt, had this occurred, Peter would have become upset, ice cream or no ice cream, but a starting point was established in a program to help Peter overcome his aversive reaction to rabbits and he was being helped to get ready to tolerate rabbits while one was actually in his presence.

On subsequent days the rabbit was moved closer and closer but never at a rate which upset Peter. In fact, if Peter had displayed discomfort despite the rewarding objects on the table, the rabbit would no doubt have been withdrawn a distance until he relaxed.

This approach taken with Peter illustrates the significance of three basic factors in learning. First a suitable task must be provided all learners. Second, a meaningful reward must be present, and third, structure must be imposed by the teacher in the presentation of the task which determines the conditions under which the reward is made available.

In another study done by Ayllon and Haughton(1) institutionalized psychotic adult patients with severe eating problems were aided in a somewhat similar manner. In most mental hospitals patients who refuse to eat present serious difficulties. A great deal of staff time and effort must go into coaxing and supporting them during mealtime. In some cases spoon-feeding is required to get them to eat. The investigators in this study decided that patients who refused to eat but who had no physical problems which precluded them feeding themselves could be helped to improve their level of functioning. A group of patients with serious eating problems were placed together on a ward. With the cooperation and participation of the medical staff a program was instituted that required all patients to enter the ward dining room in order to be fed. There were to be no exceptions. The initial task was to go to the dining room, the reward was the obvious receipt of food and the structure imposed was that no food would be made available outside the dining room itself. Despite initial reluctance most patients responded. The steps in the program designed to help these patients paralleled the levels of the hierarchy (although this was not the purpose of the study) and demonstrated how gradual introduction of increasingly complex demands can bring about dramatic changes in behavior.

Step I involved the patient's being told when it was time to eat and then being allowed an hour to get to the dining room. They were expected to attend to the nurse's announcement and the clock and respond by going to the dining room. Step II required entrance into the dining room during shorter and shorter periods of time following the nurse's announcement - - a half hour, then 15 minute, and finally five minute intervals were imposed. At this step the task and reward remained the same but the structure was altered and a greater degree of order introduced. Step III required that the patient stop by the nurse's office and pick up a penny to deposit in a can at the door to the dining room in order to gain admittance. This step involved an exploratory behavior of picking up a coin and placing it in a designated place. Step IV was at the social level. Each patient had to get the assistance of a fellow patient in order to obtain a penny. A device was placed in the ward with two buttons on it some seven feet apart. Pennies were available only when the two buttons were pushed simultaneously. The patients quickly adapted to this increased demand and the degree of interaction among them increased considerably as a result.

Had the investigators imposed Step IV initially it probably would have been difficult to achieve success with these patients. It was the selection of a suitable starting point, the systematic provision of a meaningful reward and gradual increase in the structure imposed that insured the success.

The engineered classroom design attempts to incorporate the principles of learning illustrated in these two studies. It considers emotionally disturbed children essentially victims of incomplete or faulty learning, ready however to learn something and attempts to get them ready for school while they are actually in school by adherence to the goals of the hierarchy of educational tasks.

In this regard it is important to point out that the goals in the classroom are more critical than the methodology utilized to achieve them. The two studies briefly described are illustrations of the application of behavior modification or conditioning techniques to individuals with behavior problems. The case of Peter was an example of the deconditioning of respondant or involuntary behavior while the work of Ayllon and Haughton represented the use of operant conditioning to promote acquisition of behaviors under voluntary control. Other examples of these approaches may be found in two volumes by Ullmann and Krasner.(8)

Behavior modification methodology is extremely useful in education because it focuses the teacher's attention on small increments of learning and stresses the importance of rewards and systematic structuring in the learning process. It does not, however, delineate appropriate educational goals and, as a result, may be rejected by educators. Over the past three decades an interesting contrast has existed with respect to emphasis on goals and methodology in the education of the emotionally disturbed child. The field was initially strongly influenced by the psychoanalytic approach which stressed resolution of the child's psychic conflicts before imposition of rigid demands for learning. While this approach contributed many educational goals (e.g. development of trust between the child and teacher, initial acceptance of maladaptive behavior) it was limited in terms of the practical methodology it made available to the teacher for achieving these goals. On the other hand the interest in recent years in the behavioristic approach has provided teachers with a practical methodology but few well-defined educational goals.

The hierarchy of educational tasks provides the educational goals for the engineered classroom and the behavior modification approach, the methodology for achieving these goals. The design of the classroom will now be presented in several sections devoted to class size and composition, provision for teacher and an aide, physical arrangement of the classroom, the check mark system, daily schedule, curriculum and classroom operation, and interventions.

CLASS SIZE AND COMPOSITION

Deciding how many emotionally disturbed children can be grouped together in a classroom depends on the degree of disturbance of the children, the number of teachers available, as well as the teaching resources at hand. Some children require individual tutoring while others may work efficiently in groups ranging from 2 - 20. The engineered classroom design is based on nine students with a teacher and teacher aide. This number has been arrived at after several years of trial and error exploration and makes possible the organization of the class into subgroups of three students each for various activities. These is no magic in the number nine and engineered classrooms of 10 and 11 students have been successful. However, as class size increases beyond this number classroom management requires some sacrafices in the approach central to the design.

In the group of 9 students the author prefers to include 3 children with essentially attention and response problems, three with problems at the order level and three others with exploratory and mastery problems. In most groupings of emotionally disturbed children it is hard to find students without problems at the social level and hence these are usually common to all nine children. Again, classes have successfully been set up with different compositions but the author doubts the wisdom of combining 9 extreme order problems or 9 extreme response problems in one class group.

To date, the major development of the engineered classroom has been with children from 8 to 12 years of age. Although adaptations have been made with both younger and older levels, the program discussed in this chapter refers, in the main, to the upper-elementary age level.

TEACHERS AND AIDE

The announcement that a teacher and an aide are required in an engineered classroom often elicits a groan from teachers and supervisors who see this as an extravagance beyond the means of most school districts. However, it has been found that an aide is highly desirable and that volunteer parents and high school and college students can be trained to work effectively as aides. One of the goals of the engineered classroom is to make assistance for any student not more than a short time away, and one teacher working alone is not able to meet such a demand. As will soon be apparent, the engineered classroom design is highly structured and creates an unique role for the teacher. The term "engineered" refers to a constant manipulation of the three essential ingredients in learning mentioned earlier - the learning task, provision of meaningful rewards for learning and maintenance of a degree of structure - to insure success for each student. Such a role is demanding for the teacher, particularly at first, and it is probably well to admit at the onset that not all teachers are comfortable having to function in a program that holds them accountable to such an organized system of instruction. While the operations of the classroom appear contrived and mechanistic to some, the majority of teachers who have utilized the engineered approach find that there is more than enough room for expressions of their "teaching artistry". This matter will be discussed again at the close of the chapter.

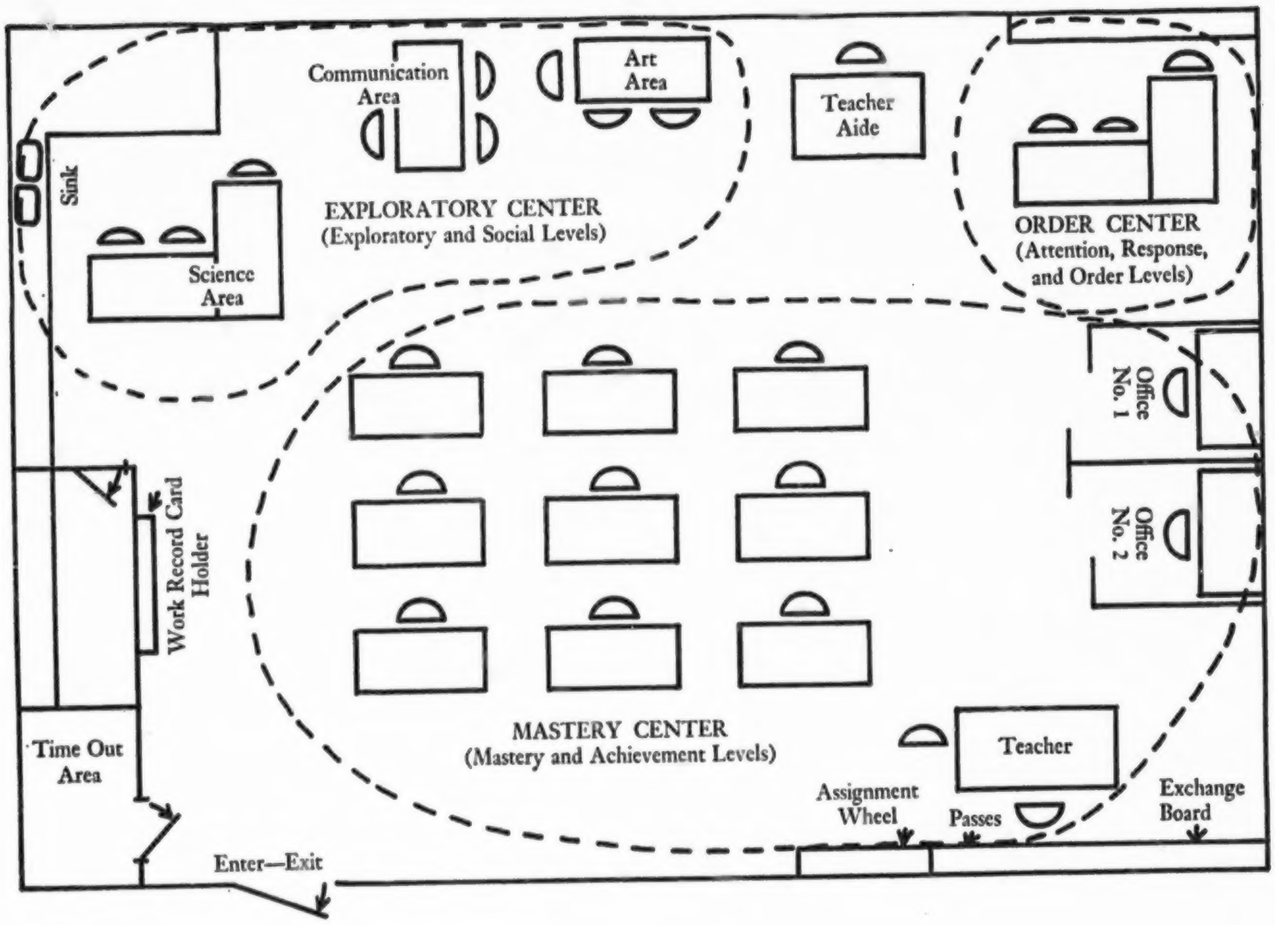
PHYSICAL ARRANGEMENT OF THE CLASSROOM

The engineered classroom should be set up in a large room which provides at least 100 sq. ft. per student. Rooms with floor plans of 1200 to 1500 sq. ft. have been found to be ideal. Each student is provided with a double desk 2 x 4 ft. and the desks should be separated so that there is several feet between each student. The double desk permits a large working surface for the child and promotes separation from students so that each child has a well defined, independent working area. A large desk also facilitates individual instruction by the teacher by allowing the teacher to sit alongside the child at his desk in a business-like manner. A floor plan of the engineered classroom - Figure 1.

The room is divided into three major working centers correlated with the levels on the hierarchy. The student desk area is the focal point of the mastery

Figure 1

Floorplan of an Engineered Classroom


Communication Area
Art Area
Teacher Aide
Sink
Science Area
EXPLORATORY CENTER
(Exploratory and Social Levels)
ORDER CENTER
(Attention, Response, and Order Levels)
Office No. 1
Office No. 2
Work Record Card Holder
MASTERY CENTER
(Mastery and Achievement Levels)
Time Out Area
Teacher
Assignment Wheel
Passes
Exchange Board
Enter—Exit

and achievement center, and assignments are given here in reading, written language and arithmetic. Also as a part of this center are two study booths or offices which are used by students for academic work. These offices are carpeted, contain upholstered easy chairs and are presented to the students as attractive working areas to help them work free from visual distraction. They are not presented as isolation booths.

The second major center is the exploratory-social center, usually set up in the vicinity of the classroom sink. Here, science, art, and communication activities will be undertaken, each at a different table. Science is viewed as an extremely useful exploratory activity because of the opportunity it affords for multisensory exploration and reality testing. Art activities are less structured and allow the child a greater degree of self expression. The communication area provides games which two or more children may engage in and is designed to foster social interaction and development of cooperative behavior. A listening post is included in this area where one or more children may engage in listening to music and story records.

The attention-response-order center is the other major defined area in the classroom. It includes two tables and a storage cabinet set up in one corner of the room. The purpose of this center is to engage the child in direction following activities which focus his attention, elicit active participation, and take him through a sequence of steps leading to a conclusion.

There are four bulletin board areas in the room: One is designed as a Student Work Board and is used to display assignments done by the students each week; another is an Assignment Board and features a large wheel used in assigning students to various activities; a third and fourth board are used in connection with the check mark system which is discussed next.

THE CHECK MARK SYSTEM

As has been stressed several times up to this point, an effective learning situation must provide some form of meaningful learner reward. In regular classrooms with normal children this is not a difficult matter, for school is essentially a very rewarding environment. Teacher attention, satisfaction from task accomplishment, sensory-motor rewards of looking, listening, touching and moving, teacher praise, peer group status, and skill acquisition are all available for the child whose performance in the class is such that he obtains them. For the emotionally disturbed child many of these rewards are non-existent, at least if he is placed in a regular classroom. In an effort to guarantee that some meaningful reward is available for even the most resistant learner, the engineered classroom uses a system of token rewards - check marks - which have an exchange value for tangible items such as candy, toys, and trinkets.

The check mark system is an extension of the more traditional reward system relied on by all teachers in classrooms every day and does not preclude the childs developing motivation for other types of rewards mentioned above. In the author's work over a several year period with autistic and other severely disturbed children, he has never found a single child who did not eventually begin to respond for the promise of social attention, task accomplishment, sensory rewards, and even grades. The check mark system functions as an initial procedure which helps get children started learning in a classroom situation which may have essentially non-rewarding connotations for them as a result of previous experience. The use of check marks along with the small class size, the help of two teachers, and the unique physical arrangement of the room, establishes a totally different educational environment which is intriguing and satisfying. In this respect it serves much the same function as favorite toys which were given Peter. These helped create a totally positive situation before the negative rabbit was introduced.

Each morning as the child enters the classroom he picks up a Work Record Card at the door. This is a 4" x 6" card which is ruled with 200 squares and is kept in a holder on the wall with the child's name on it. As the child goes through the day he receives check marks on the card reflecting his classroom functioning and task accomplishments. Usually, a possible 10 check marks are given following each 15 minute work period. Two checks are given if the child started his work, three if he followed through on the assignment and a possible five bonus checks are administered for "being a student". In an engineered classroom "being a student" refers to a different criteria for each student. Teachers use the bonus check marks to reward those aspects of the student's behavior which are most critical to his learning problem and most basic to his deficits on the hierarchy. An extremely inattentive student might be given the five bonus checks just for improving slightly in his attention span; an unresponsive student for trying a little harder; a disordered child for trying to follow directions; a child not given to ready exploration of his environment if he becomes more involved; a child with social difficulties if he displays appropriate group behavior, cooperated, or waited his turn; and finally, the child whose primary problems centered around academic deficits would receive his five bonus check marks if he correctly did the assignments given him. As the child falls short of the minimal expectation the teacher has for him the number of bonus checks is reduced.

In the giving of the check marks the teacher functions in a non-personal manner much as a shop foreman paying workers on an assembly line for what they have actually earned during a work period. The attempt is to use the check mark system as a non-conflictual meeting ground for the emotionally disturbed child and the teacher - at least initially devoid of an interpersonal emphasis. The teacher communicates to the child that "This is what you have earned" not "I'm giving you this because I like you" or "Because you did what I asked". Although the interpersonal element obviously can not be eliminated it is limited at first, particularly with children with serious social problems. As the child gains in his competency at the attention, response, order, exploratory and social levels the emphasis might change and the teacher may acknowledge "I'm pleased because you did that just the way I wanted you to". One of the most important advantages of the check mark system is that it guarantees teacher contact with each child at least three times an hour.

The child totals up his check marks each day and these are graphed on a Work Report kept on his desk. This provides continual feedback and allows the child to compare his individual progress day by day. While some children may become preoccupied with the total number of checks being given to their classmates and become competitive regarding comparisons it has been found that a reminder that "In this room every student earns check marks for doing what he needs to do. Since everyone is working at their own level checks are given for different reasons" causes such behavior to rapidly diminish. All children obtain approximately an equal number each day.

In addition to giving check marks following 15 minute work periods, the teacher may also use the "surprise bonus". When a given child is displaying some behavior close to one of the teacher's goals for him he may be surprised and given five or ten extra check marks on the spot. At other times when the class is having difficulty settling down the teacher may announce "Each student who is ready to work and who has followed my directions will receive five extra check marks". These are then immediately given out to those students who fulfilled the teacher's expectations. No additional comment is made about the students who were "not ready" and who did not receive the surprise bonus check marks.

Completed check mark cards may be exchanged weekly for tangible items and an Exchange Board displays one, two, and three card items. The cost of each item usually averages 5¢ for one card, 10¢ for two cards and 15¢ for three cards. The monetary value of the exchange items has been found to be very insignificant and it appears that the most important factor is that they are earned in the classroom. Children with enough money in their pockets to buy the equivalent of the teacher's entire supply of exchange items at the local 5 & 10¢ store display delight with a five cent item earned with check marks.

It should be mentioned that the first day of the class when none of the children have ever been in the room before the teacher places a candy unit on top of each check mark given during the first two hours of the class. Following this, the children are expected to save their check marks and turn completed cards in after longer and longer periods of delay.

DAILY SCHEDULE

The class operates on a 240-minute daily schedule, in line with the State of California minimum for special classes for educationally handicapped children. It runs from 8:30 a.m. to 12:30 p.m. The schedule, including provision for check marks is as follows:

TIME	ACTIVITY	POSSIBLE CHECK MARKS & CRITERIA
8:30 a.m.	Flag salute and Opening exercises	3: Coming on time. 2: Picking up card and going to seat-ready to work
8:35 a.m.	Order	10: Doing order worksheet 2: Starting 3: Following through 5: Bonus for "being a student".
8:40 a.m.	Reading (Skill reading, individual reading, work study).	10 check marks each 15 minutes. (Same criteria as above)
9:40 a.m.	Recess (Outside room)	10 check marks following recess. 2: Leaving the room 5: Behavior during recess 3: Returning and being ready to work.
9:50 a.m.	Arithmetic (skill arithmetic, individual arithmetic, and activity arithmetic)	10 check marks each 15 minutes
10:50 a.m.	Recess (Nutrition - Inside room)	10 check marks for this period 5: Behavior during recess 5: Being ready to return to work.
11:00 a.m.	Physical Education	10 check marks 2: Leaving the room 5: Behavior during the period 3: Returning and being ready to work.
11:20 a.m.	Exploratory (Science, art, and communication).	10 check marks following each 15 minutes
12:20 p.m.	Check Out	Total number of check marks received for the day are graphed on the child's Work Report on his desk.

CURRICULUM AND CLASSROOM OPERATIONS

The initial order period is designed to settle the students down and involve them in a short direction-following task stressing control and completion. Commercially available perceptual motor training worksheets are used along with simple tracing, design copying, and visual discrimination tasks designed by the Santa Monica staff.

The reading program takes place three times weekly, and as can be seen from the schedule, is divided into three 15 minute periods.

Individual reading is done at the teacher aide's desk with each child. The child brings his work reader (a basal or remedial text close to his actual functioning level) to the desk and reads aloud for a three minute period. The three minutes are timed by a small hour-glass which the child turns over when he is ready to start reading. As the child correctly completes each line of reading material the teacher aide deposits a candy award (M & M) in a paper cup beside him. The aide also keeps a record of each word the child miscalls and these are printed on a 3 x 5 file card for later study. At the end of the 3 minute period the child is asked several comprehension questions and then takes the cup of candy and new reading words back to his desk. Candy is used in this activity rather than check marks because of the high motivation exhibited by students for practicing their reading before going to the teacher aide's desk and their good concentration during oral reading. The presence of the candy does not seem to distract the child and careful attention is given by the teacher to the level of the child's work reader so that he will both achieve success and learn new words. Inevitably the question is raised about dental and health problems in relation to the giving of candy during the activity. Where such problems exist raisins, sunflower seeds, or peanuts have proven equally effective.

After each child in a given group has had individual reading an assignment wheel is turned, the teacher has all students put down their work and both teacher and aide circulate giving children their check marks. This takes approximately three to five minutes and the children are expected to wait quietly for their check marks. The bonus check marks given for "being a student" will reflect such "waiting" behavior.

Next, the groups move to either word study or skill reading. Word study is done at the child's desk. The teacher circulates (while the aide continues individual reading with another group of three students) and goes over accumulated reading words with each child. The cards are flashed before him and he is held for recognition. As the child correctly reads a word the teacher puts a plus on it and after three successive correct readings the card is filed away alphabetically in a small file box on the child's desk and no longer reviewed. Spelling words acquired during story writing to be discussed later are also reviewed at this time.

Following word study the wheel is turned and check marks are given all students. It is important to point out that during the check mark giving period not only is the previous assignment corrected and acknowledged with check marks but the next 15 minute assignment is introduced. It has been found that this type of individual transition period is very useful in maintaining the work-oriented atmosphere in the class. The teacher does not rely on verbal assignments in front of the class or repeatedly calling out "Boys and girls! Boys and girls! That means you too, Henry! Give me your attention! I am waiting for two people in row three." etc.

Skill reading involves an independent vocabulary and comprehension building activity and commercial materials, including programmed units, are used. The Santa Monica staff has developed several types of word games, decoding exercises, and other activities for use with poor readers who cannot work for any extensive periods of time in reading. The interventions used to assist a child who cannot do a reading assignment or any other assignment for a period of time will be discussed in a later section.

Twice a week story writing is done by the entire class rather than in small groups. The teacher usually makes a short motivation presentation in some area of interest to the class (e.g. knighthood, deep sea life) and the students are expected to write about the topic. This is a difficult activity to get children with severe reading and spelling problems to engage in and alternate activities are available for those unable to write. The Santa Monica staff has prepared simple sentence completion and picture labeling materials for these children.

Following either reading or story writing, the class is dismissed for recess. This is taken outside the room and as each child leaves he puts his Work Record Card away in its holder. Upon returning the card is picked up and the children receive a possible ten check marks for the recess period.

The arithmetic period occupies the next hour. Students work for 15 minute intervals on two or three types of number work. The entire class works on the same type of assignment although it is individualized for each child. Arithmetic fundamentals including basic addition and subtraction facts and concepts, the multiplication tables and process, and division are assigned as appropriate. Following this arithmetic skills are put to work in problem solving. Students are given specially prepared worksheets or use standard texts. For the student who is able to pursue longer work periods this activity may take up two 15-minute intervals, although the child will be asked to stop his work in order to receive check marks half-way through. The Santa Monica staff has developed multi-level arithmetic drill sheets which can be quickly altered to fit a particular child's level in addition, subtraction, multiplication, or division and these may be used with slower students during both the drill and skill periods. For the child who cannot handle a 15-minute work period in arithmetic,work sheets involving measurement, counting, form discrimination, and coloring are utilized for one or more intervals. It is important to stress that during arithmetic, however, all students receive check marks following each 15-minute interval.

A 10-minute nutrition period is held in the room and the children have a snack. They are allowed to move about the room and various free-time activities are available. Ten check marks are given following this period and the children leave the room for physical education. Work Record Cards are taken outside to the playground and checks given when students reach the play area, finish their play, and return to the room.

Following the physical education period a 10 to 15 minute group listening activity may be used to help students effect a transition from the active play on the playground to the more restricted behavior in the classroom. During this time the teacher reads a portion of a continuing story aloud.

The final period of the day is devoted to exploratory activities. For this period another assignment wheel is utilized. The same groupings used during the reading period are employed. Each 15 minutes three children go to the science area, three to the art area, and three to the communication area. The teacher remains in the science area and introduces a specific science task to each group as they rotate to the area. The aide circulates between the art and communication areas. Following each 15 minute interval all children return to their desks, receive their check marks and are reassigned by means of the wheel. The Santa Monica staff has devised a series of science tasks in such areas as magnetism, air, sound, light, chemistry, and has prepared cards for each task

Each task is selected for its intriguing interest value rather than because it falls within any particular grade level curriculum. It may be recalled that the exploratory level falls below the mastery level and hence science experiments are chosen for their multisensory rather than intellectual value. Nevertheless, simple, accurate descriptions of all science experiments is given by the teacher to each group. Following the introduction of each day's science task the card is filed at the center and is available for students during the interventions to be described in the next section.

Art activities are varied and have been organized by the Santa Monica staff to include projects which allows the child self expression. An attempt is made to keep these tasks simple so that they can be completed within a 15 minute work period. However, the children may continue them over from one day to the next. The art task cards are also filed at the art area for later reference and replication.

Communication tasks for building social skills are introduced during the exploratory period and are also kept filed at the communication area for later usage. Since games entered into by two or more children inevitably involve a winner, those based more on chance rather than skill have proven most successful.

After the final 15-minute exploratory interval the children return to their seats and the final check marks are given. Following this the child's total number of checks received during the day are counted by the teacher and entered on his Work Report. The children then return their cards to the Work Record holder and leave the room Check mark exchanges are held once a week, usually on Friday, at the end of the day.

INTERVENTIONS

Whenever it becomes apparent that a given task cannot be successfully accomplished by the child the teacher must be prepared to re-assign him so that he does not fail. Just as the rabbit occasionally had to be moved back from Peter when it was brought too close during de-conditioning, the teacher must be prepared to reduce school expectations to insure that the emotionally disturbed child is successful at any given moment.

In the engineered classroom this is taken care of by means of a series of interventions which involve descending the hierarchy of educational tasks until a level is found where the child can succeed and earn check marks. As long as the student can function with an assignment at any of the levels of the hierarchy he earns his full complement of check marks. There is no penalty attached to re-assignment at lower level tasks.

The interventions will be discussed one by one. In actual practice the teacher may try them one at a time or, most likely, select the one that appears to be most appropriate for a given child at a given moment. An intervention is necessary when a child exhibits resistance, withdrawal, anxiety, or frustration. The ideal time for initiation of an intervention is in anticipation of the actual problem, or very shortly after the first sign of inability or unwillingness to do an assigned task. The first seven interventions are considered "student interventions" because they involvd the child's continuing to earn check marks at all times. Interventions eight and nine are "non-student interventions" because they do not enable the child to continue earning check marks.

1. Send Student to Study Booth. (Mastery level)

The first intervention involves sending the child to work on an assigned mastery task in one of the study booths or "offices". It has been pointed out that these booths are presented to the children in a positive manner and as a result they are desirable working areas. In being sent to the booth the child picks up a "pass" (cut-out wooden key painted yellow) from the teacher's desk and hangs it on the wall inside the booth. This signifies his assignment to the study booth for a period of time. It has been observed that merely allowing the child to change position and move around in the room appears to interrupt a period of boredom or upset effectively.

2. Modify Assignment. (Mastery level)

The next logical intervention in terms of the hierarchy and the engineered classroom philosophy is to change the mastery task given the child, either making it easier, different, or perhaps more difficult in an effort to get him involved. Sending the student to the study booth with a modified assignment may also be used at this time.

3. Re-structure Verbally. (Social level)

When the mastery interventions described above are not successful or appear inappropriate an intervention at the social level is next in line for consideration. This intervention involves verbal restructuring on the part of the teacher, using social approval or disapproval as leverage. The child is reminded of the teacher's expectation for him in relation to the assigned task and his behavior. It has been previously mentioned that interactions between teacher and child in the engineered classroom are largely task-oriented because of the poor relationships with adults previously experienced by many emotionally disturbed children. Nevertheless, with some students a reminder by the teacher regarding what is expected may be all that is necessary to help them improve their behavior. This intervention is perhaps most often used by teachers in regular classroom with children who display problem behavior and often reinforced the childs negative concept of school and teachers, therefore it should be only used after careful consideration and it is often deleted in the intervention process.

4. Send to Exploratory Center. (Exploratory Level)

The next intervention re-assigns the child to another task center in the room. Upon direction the child picks up a blue pass key from the teacher's desk and goes to the exploratory center where he hangs it on the wall, signifying re-assignment to this area. The teacher selects one of the previously demonstrated science, art, or in some cases, communication tasks and assigns it to the child, making sure all the materials are available and that he understands what to do. Assignments at the exploratory center are always teacher-selected.

5. Send to Order Center. (Order Level)

Since the exploratory center involves a high degree of stimulation it may not be as appropriate for some disturbed children at a given time as the Order Center. After picking up a red pass key at the teacher's desk, the child hangs it on the wall by the order center and is given a simple direction-following task such as making a puzzle, copying a pegboard design, stringing beads, deciphering secret code with the aid of a key, or constructing a model of plastic or metal components.

6. Take Student Outside and Agree on a Task. (Response Level)

In an effort to maintain contact with the student and keep him earning check marks an intervention at the response level may be undertaken outside the room. Both student and teacher go out of the classroom and agree on some task the child will undertake, such as turning somersaults on the lawn, swinging on a swing for 15 minutes, punching a punching bag, or even resting in the nurse's office for a period of time. If the student successfully completes the task he is given his full complement of check marks and returned to the room. Following a response intervention the teacher attempts to select some assignment in the classroom to insure the student's success.

7. Provide Individual Tutoring and Increase Check Marks. (Attention Level)

The intervention corresponding to the lowest level on the hierarchy involves the teacher devoting full time to individual instruction with the student. Such individual tutoring is not always possible for extended periods of time because of the needs of the other students, but it is the next logical step to take in order to help the child. It may also include doubling the number of check marks given the child during a 15 minute period or in some cases going back to placing a candy unit on top of each check mark.

8. Time Out. (Non-student)

Interventions eight and nine are non-student interventions and require that the child give up his Work Record Card and the opportunity to earn check marks for a time. During the time-out intervention the child is told that he cannot earn check marks for a five, ten, or fifteen minute period, during which he must sit in isolation, usually in the principal's office. Following this time-out period the child is immediately returned to the class with no questions asked. As long as he sat quietly during the time-out period he is able to return to the classroom and begin earning check-marks again. In returning the child to class the teacher will select an intervention level which seems to hold promise of successfully re-integrating him back into class. There is no extracting of promises that the child "be a good boy" or statements to the effect that "you can return when you feel you can control yourself". The student's return is based solely on the clock and there is no verbal pressuring on the part of the teacher or principal. In regard to this and the final intervention, the importance of total school support, including the office clerks and the principal cannot be minimized. Fortunately, in the Santa Monica project, there has been consistent cooperation evident from the Superintendent's office to each level in the individual schools.

9. Exclusion (Non-student)

When the child is unable to tolerate a given time-out period or has to be placed in a time-out intervention three times in one day, he is immediately excluded from school and if at all possible, sent home. There is no "lecture" given by anyone in the school. He is merely told he cannot remain in school because it appears he cannot "function as a student". He will be permitted to return the next day "with no hard feelings". If a given student has to be sent home three times in one semester he must earn his way back into class and can only attend one hour the first day; two the next, and so on.

As can be seen from the nature of the interventions, an attempt is made to move the "noxious rabbit" of school demands as far out of the picture as may be necessary in order to maintain the child in a successful learning situation. When it is apparent that no amount of task manipulation will successfully engage the student in learning, the final consequence of exclusion is the only resource left. It should be stressed again that time-out or exclusion carries no "bad boy" connotation with it, but represents a "fact of life" which the student must be made aware of when he is unable to meet the school and the teacher even a small part of "half-way".

Many aspects of the engineered classroom design have been utilized by teachers of emotionally disturbed children for years. The use of an aide, small class groupings, activity centers and an individualized instructional approach is not new to education; nor is the notion that children who are not ready to learn must be helped to get ready in school a novel one. In the past, teachers of children with learning problems have been aware that a different task orientation was required with their students. But the importance of providing meaningful rewards for learning and maintaining systematic structure often has been overlooked. While "success experience in school" has become the major goal for all exceptional children, including the emotionally disturbed, suitable methodologies to aid in the attainment of such a goal have been slow to develop. The model utilized by Jones with Peter and the rabbit demonstrated such a methodology, as did the systematic shaping of behavior accomplished by Ayllon and Haughton with institutionalized psychotic patients.

The engineered classroom design attempts to take the goal of "success experience" and implement it through behavior modification methodology. Few educators would argue with such a goal, but often there is a considerable reaction to the means utilized in the engineered classroom design for achieving it. Concerns typically center around reliance on extrinsic rewards, questions about eventual reintegration into the regular classroom, and the "technician" status of the teacher in the engineered classroom.

The use of tangible rewards in school has been viewed by some as an unwholesome compromise with educational values and as outright bribery. This reaction is probably related to the term "reward" rather then the principle of acknowledging certain appropriate behaviors in school through systematic positive consequences. Providing the grade of "A" for outstanding effort constitutes an acceptable means of acknowledging a student's performance in the classroom but rewarding him with check marks which have a tangible exchange value may not be seen in the same light. Actually, there is little difference between the two approaches except that the grade represents a more sophisticated and highly socialized acknowledgment as compared with check marks which are more concrete and primitive in nature. The principle of acknowledgment of accomplishment however is identical. Emotionally disturbed children are often less sophisticated and socialized learners than children who function effectively in regular classrooms and the provision for tangible rewards is viewed as a logical and temporary extension of the traditional system of acknowledgment relied on by all educators. The term "temporary" is used advisedly, for in the author's experience the check marks and later tangible exchange items lose their potency fairly quickly and once the child is involved in a successful learning experience he naturally moves toward the seeking of more traditional educational rewards such as task accomplishment, sensory motor experience, social status, praise and grades.

In this regard reintegration of children back into regular classrooms from the engineered classroom has proven surprisingly uncomplicated. The fears of those who would predict that children given tangible rewards in school for learning would have to be followed around for the rest of their lives and immediately rewarded with candy for each task they accomplish are completely unfounded. As the child learns to pay attention, respond, follow directions, explore his environment, obtain status as an accepted member of a peer group in the classroom and master the basic academic skills he becomes a ready candidate for reintegration. The engineered classroom is presented to the student from the very beginning as a special program to help him "catch up" as quickly as possible. Often children express continued interest in going back to their regular classroom and once their achievement level is close to their expected grade level they are reintegrated for limited periods each day. The true value of the engineered classroom seems to be that in this totally unique classroom environment where success is guaranteed and small units of accomplishment are continuously acknowledged on an immediate and concrete basis the child gains confidence and ability, and rather than regressing he begins to progress, in some cases for the first time in several years.

The role assigned to the teacher in the engineered classroom is also unique. This role is based on the assumption that a task oriented relationship between teacher and child is more conducive to remediating learning deficits rather than one with an interpersonal emphasis. The teacher is directed to use non-verbal means of relating to students whenever possible. Excessive verbage is seen as a hindrance when working with emotionally disturbed children because of the vagueness of word symbols and negative associations with adults who "lecture" and "criticize".

The giving of checkmarks every 15 minutes and correcting each child's work during this period admittedly places an extra burden on the teacher, as does the systematic reassignment of students who experience difficulty during the day. While the engineered concept probably runs counter to some teacher's personality and teaching style to such a degree that it would be unwise to expect them to implement it, the author has found that most teachers of emotionally disturbed children respond positively to it, once they establish the routine.

It seems that provision of rewards for teachers in teaching is often minimized or overlooked. With emotionally disturbed children these rewards may be few and far between because of the unpredictability and variability of the children themselves. The engineered classroom design increases the probability of the teacher receiving rewards because, through a constant assessment of what each child needs and can do successfully, a clearer picture of teaching goals is provided, and more frequent indications of the child's progress made available.

It is not the intent of the engineered classroom design to reduce the teacher to the level of a mere "technician". While the emphasis on structure and routine and non-verbal direction alters the traditional teacher's role, there is still a great deal of room for professional teaching competence and creativity. It is also not the intent of the program to impose such a role on the teacher indefinitely. The engineered classroom is largely a plan for building emotionally disturbed children's competency at the attention-response, order and exploratory levels, and hence "launch" them into learning. In future years variations of the engineered classroom may be developed which focus on social, mastery, and achievement levels to a greater degree.

This chapter has reported on a classroom design still in the experimental stage, which attempts to help emotionally disturbed children get ready for school while they are actually in school. It views emotional disturbance in an educational context as a lack of readiness for learning and postulates a hierarch of educational tasks which provides the program goals. Behavior modification techniques are utilized in providing meaningful rewards and establishing suitable structure in the classroom. While the use of tangible rewards and the degree of structure and routine in the program is in direct contrast to some of the more traditional approaches with emotionally disturbed children, the design has been found practical and effective in the public schools with children who have long histories of maladaptive behavior in the classroom, including serious learning deficits.

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APPENDIX III

Dissemination of the Engineered Classroom Design as Developed in The Santa Monica Project

The following presentations were made by one or more of the authors during the Santa Monica Project Demonstration Grant period, Sept. 17, 1966 - Sept. 17, 1967, and included discussion and demonstration of the Project program.

ACLD Conference - 1967	New York City
CEC Conference - 1967	Bakersfield, California
CEC Conference - 1967	St. Louis, Missouri
CEC Conference - 1967	Los Angeles, California
Learning Disabilities Conf. (Orange & San Diego Counties)	Disneyland Hotel Anaheim, California
International Convocation on Children with Learning Disabilities	Pittsburgh, Pennsylvania
Troubled Child Workshop	University of Oregon, Eugene, Oregon
Behavior Modification Workshop (600 Educators from Northern California)	Marin County Schools, Calif.
Central Florida CEC	Orlando, Florida
Arizona State Dept. of Education	Flagstaff, Arizona
Nevada State Dept. of Education	Squaw Valley, Calif.
Calif. Association for Retarded Children	Santa Rosa, California
L.A.County Society for Child Psychiatry	Los Angeles, California
American Academy of Pediatrics	Portland, Oregon
NDEA Conference	Calif. State College Hayward, California
School Psychologists Symposium	University of California Berkeley, California

Austin Mental Health Clinic	Austin, Texas
University of Arizona	Tucson, Arizona
University of Southern California	Los Angeles, California
Riverside Learning Disabilities Center	Riverside, California
California School for the Deaf	Riverside, California
University of Wisconsin	
Sacramento Schools	Sacramento, California
Santa Rosa Schools	Santa Rosa, California
Walnut Creek Schools	Walnut Creek, California
Culver City Schools	Culver City, California
El Monte Schools	El Monte, California
Torrance Schools	Torrance, California
Whittier Cooperative Schools	Whittier, California
Anaheim Schools	Anaheim, California
Mount Diablo Schools	Mount Diablo, California
Campbell Union High Schools	Campbell, California
La Habre Schools	La Habre, California
Manhatten Beach Schools	Manhatten Beach, California
Alhambra City Schools	Alhambra, California
San Bernardino Schools	San Bernardino, California
La Puente Schools	La Puente, California

During the 1966-1967 school year the Demonstration Project was visited by more than 750 public and private school teachers and administrators, as well as countless representatives from various Universities.

A selected list of teachers, administrators, and officials, with their official organizations, is included. The groups were seldom limited to one person and often consisted of as many as 10 to 12 visitors at one time.

Dr. Nedergaard	Denmark	Boekward Schools Program
Mr. McGary	Ventura	Ventura Unified Schools
Dr. Samuel Kirk	Univ. of Illinois,	Institution for Exceptional Children
Dr. Orville Johnson	Syracuse University, Syracuse, New York	
Dr. Corinne Kass	Washington, D.C.	U.S. Office of Education
Dr. Milton Miklas	Los Angeles	Los Angeles County Schools
Mr. Kenneth J. Dobson	Pulaski, Virginia	Pulaski County Schools
Dr. Quay	Univ. of Illinois	Children's Research Center
Dr. Brenthro	" " "	" " "
Dr. MacQueen	" " "	" " "
Dr. MacQueen		
Dr. Nelson	Los Angeles	Univ. of Southern California
Mrs. Walk	Los Angeles	Los Angeles City Schools
Miss Carr	" "	" " " "
Mr. Garmston	San Francisco	Bellevue Schools
Dr. Pogue	El Segundo	El Segundo Schools
Mr. Anderson	Culver City	Culver City Schools
Dr. Robert Curry	Long Beach	Cal State - Long Beach
Mrs. Cyrog	Whittier	Whittier Schools
Mrs. Tate	Covina	Covina Schools
Mr. Green	Ventura	Ventura High School
Mr. Bebilheimer	Fountain Valley	Fountain Valley Schools
Mr. Ferreira	San Juan	San Juan Unified Schools

Engineered Classrooms as demonstrated by the Grant during the 1966-1967 school year are actually being used as a result of the project in the following districts.

La Habra, California

Anaheim, California

Whittier, California

Tucson, Arizona

Austin, Texas

Walnut Creek, California

Santa Rosa, California

Marin County, California

Culver City, California

El Monte, California

Campbell High School District, San Jose, California

San Juan Unified Schools, Sacramento, California

California State College at Los Angeles

Mt. Diablo, California

Riverside, California

Grant Union High School District, Sacramento, California

Bellevue Union School District, Santa Rosa, California

Each of these districts have in turn been influential in the development of similar programs in their immediate areas. La Habra has had many visitors and been instrumental in helping neighboring districts, such as Brea Unified Schools, start engineered Classrooms for educationally handicapped students.

The Mental Health Clinic in Austin, Texas has influenced the entire state program. On January 18, 19, & 20, 1968 every teacher of the educationally handicapped in the entire state will participate in a Conference with staff members from the Santa Monica Project. This is a direct result of the success of the program in the two classrooms in the Austin Mental Health Clinic.

APPENDIX IV

TASK ATTENTION CRITERIA

Eye attention is primary criteria but head and body attention are acceptable subject to specifications listed below.

I. EYE ATTENTION

a. Child's eyes must be on task or teacher when:

1. Teacher talking to class
2. Teacher giving him checks
3. Teacher talking to him individually or helping him
4. Child doing an assignment at his desk

NOTE: Eyes not to shift to folders, bos, etc. during a task unless these are being employed during task.

During task at desk, no loud noises or talking to others, but whispering to self permitted.

II. HEAD ATTENTION

a. Child's head must be facing task when:

1. Back turned to observer in study booth or at exploratory or order centers.

III. BODY ATTENTION

a. Child must be sitting in chair quietly when:

1. Hand up waiting for teacher
2. Waiting for checks, following receipt of checks, or while waiting for others to receive their checks
3. All other waiting periods (e.g. when finished task, before recess and dismissal)

IV. GENERAL

a. Child not credited when he calls out to teacher, talks to classmate during work periods, or sits and plays with objects at desk.

b. If leaves seat or room without permission, do not time until he returns.

c. If sent on errand in room (e.g. to get pass, go to center, sharpen pencil, etc.)credit for body attention (e.g. does not disturb others, touch irrelevant objects, and goes directly to assigned area). Do not time when sent out of room by teacher on errand or when goes to bathroom or for drink outside.

d. If taken from room for misbehavior (e.g. time-out room or to be sent home) do not time. An exception here is the response intervention when observer credits child for body attention as child is being taken to door by teacher.

e. Child who holds pencil during waiting period is not docked unless he plays with it.

f. When teacher says "stop" child has 30 seconds to put pencil down and work away before being docked.

g. Any time an observer sees or hears an assignment being disobeyed by child, the child must be docked (e.g. if it can be seen that child has not finished all math problems and he has put himself into a waiting period instead of completing task. If, however, an observer cannot see whether task is completed or not, or if he has not heard the teacher assign child to a specific task, the child is not docked for a self-imposed waiting period: the criteria being that he engaged in task for at least 30 seconds before stopping.

h. Child is not docked for looking at date on blackboard or any other words, etc. which teacher wrote there that are a part of the assigned task.

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TITLE

The Santa Monica Project: Demonstration and Evaluation of an Engineered Classroom Design for Emotionally Disturbed Children in the Public School. Phase I - Elementary Level

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ABSTRACT

The Santa Monica Project evaluated the effectiveness of an engineered classroom design over a one-year period with 54 educationally handicapped children in 6 classrooms in the Santa Monica Unified School District in California. The design is concerned with getting educationally handicapped children paying attention, responding, following directions, exploring their environment, and getting along with others before holding them for academic and intellectual performance. This is accomplished in a classroom set up with three major centers: 1)mastery-achievement, 2)exploratory-social, 3)attention-response-order. There are 9 children in a class supervised by a teacher and aide. Children are assigned tasks at each center in keeping with their individual educational problems and are awarded check marks each fifteen minutes for behavior and work according to behavior modification principles. The dependent variable in the project included achievement testing three times over the year and daily task attention measurements. Task attention was recorded by two observers present in both experimental and control classrooms who clocked the number of seconds each child's eyes were on an assigned task during five-minute samples taken five times daily. In general, children in the experimental classroom utilizing the engineered design enjoyed a five to twenty per cent task attention advantage over children in the control classrooms not using the check mark system and all aspects of the design. Experimental classes which abruptly withdrew the design at mid-year showed no decrease in task attention, in fact they improved. While reading and spelling gains were not significantly different between experimental and control conditions, gains in arithmetic fundamentals were significantly correlated with the presence of the engineered design.